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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION

MAR 4 1932

Cradle of Dental Education—*Mills*
Economics—*Merritt*
Immediate Full Restorations—*Jaffe*
Progress Report—*Taylor and Paffenbarger*
Wrought Gold Alloys—*Taylor et al.*
Diagnosis and General Practice—*Lyons*
Atrophy and Hypertrophy—Effect on Stability —*McKevitt*
Care of Investing Tissues—*Epstein*
Tissues and Partial Dentures—*Maves*
Nitrous Oxid Anesthesia—*Clark*
Full Denture Construction—*Hughes*
Monilia Following Extraction—*Hardgrove*
Enamel Tufts and Caries—*Beust*
EDITORIALS
Preparation of Papers—Educational Publicity
COUNCIL ON DENTAL THERAPEUTICS
Accepted Dental Remedies
Glycerin in Tooth Pastes
BUREAU OF PUBLIC RELATIONS
Dental Health Education—*Schoeny*
Scientific Exhibit—*MacMillan and Deuschle*

CONTENTS

C. R. Lawrence, D.D.S. ..... Frontispiece

ORIGINAL COMMUNICATIONS

Bainbridge, Ross County, Ohio, the Cradle of Dental Education.
By Edward C. Mills, D.D.S., F.A.C.D. 361
The Economics of Dental Practice.
By Arthur H. Merritt, D.D.S., F.A.C.D., F.A.A.P. 389
Immediate Full Restorations.
By Sidney S. Jaffe, D.D.S. 396
Progress Report on Research on Dental Materials (1931).
By N. O. Taylor, Ph.D., and George C. Paffenbarger, D.D.S. 404
A Study of Wrought Gold Alloys: Preliminary Report.
By N. O. Taylor, Ph.D., George C. Paffenbarger, D.D.S., and W. T. Sweeney, A.B. 410
Diagnosis of Oral Conditions as Related to the General Practice of Dentistry.
By Chalmers J. Lyons, D.D.S. 415
Atrophy and Hypertrophy of the Maxillary and Mandibular Alveolar Process and Their Effect on the Stability of Artificial Dentures.
By F. H. McKevitt, D.D.S. 424
Care of Investing and Supporting Tissues in the Presence of Constitutional Disturbances.
By Irwin P. Epstein, D.D.S. 452
A Plea for Healthier Environmental Tissues in Bridge and Partial Denture Construction.
By Herman A. Maves, D.D.S., F.A.C.D. 458
A Practical Discussion of Nitrous Oxid Anesthesia.
By H. B. Clark, D.D.S. 470
Problem of Full Denture Construction from the Standpoint of the General Practitioner.
By F. C. Hughes, D.D.S. 477
Infection with Monilia Following Extraction of Teeth.
By T. A. Hardgrove, D.D.S. 483
A New Fusible Alloy for Dental Models.
By Charles E. Fowler, D.D.S. 487
Morphology and Biology of the Enamel Tufts, with Remarks on Their Relation to Caries.
By Theodore B. Beust, M.D., D.D.S., F.A.C.D. 488
A Compilation of Statistics on Vincent's Disease Throughout the United States.
By I. Disraeli, D.D.S. 494
Scientific Attitude in Dentistry.
By William Schoenfeld 497

EDITORIAL DEPARTMENT

The Preparation of Papers for Dental Societies.—It Takes All Kinds.—Rules Regarding Educational Publicity 499-507

COUNCIL ON DENTAL THERAPEUTICS

Accepted Dental Remedies 508
Glycerin in Tooth Pastes 509
Campho-Phenique—Not Acceptable for A. D. R. 510
Calsodent—Not Acceptable for A. D. R. 513

BUREAU OF PUBLIC RELATIONS

American Dental Association to Broadcast 515
Dental Health Education in Louisiana.
By Leo J. Schoeny, D.D.S. 516
Development of the Scientific Exhibit.
By Hugh W. MacMillan and F. M. Deuschle 521

CURRENT LITERATURE

Extracts and Abstracts 525

MISCELLANY

Book Reviews 531
Social Insurance: Governments Inefficient, Corrupt or Both.
By Edward H. Ochsner, M.D. 533
May Day—National Child Health Day 534
Gorgas Essay Contest Announced 535
News 536

Announcements 537

ADVERTISING

Index to Advertisements A-41
Classified Section A-35

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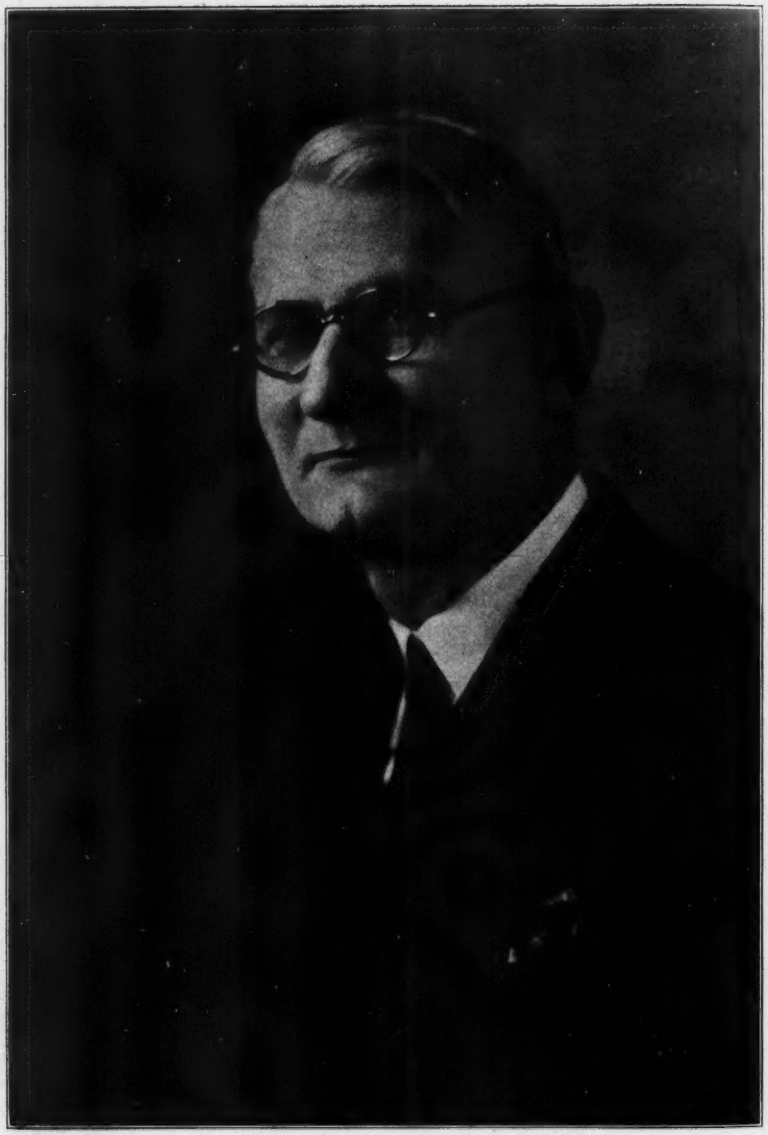


C. R. LAWRENCE, D.D.S., Enid, Oklahoma
Vice President of the American Dental Association

THE JOURNAL
of the AMERICAN DENTAL ASSOCIATION

Vol. 19 MARCH, 1932 No. 3

Original Communications

BAINBRIDGE, ROSS COUNTY, OHIO, THE CRADLE OF DENTAL EDUCATION

By EDWARD C. MILLS, D.D.S., F.A.C.D., Columbus, Ohio

IN the beginning. Forceful, meaningful words. For always, everything has its beginning. Often—at the moment—it seems of little import. The historical background becomes shrouded in mystery, and only when Time reveals that someone with vision and science and skill has offered to humanity comfort and welfare and happiness, and the votaries become zealous in expanding its field of usefulness, contemplating its increasing advancement in the future, is there awakened in the human mind that inherent, inquiring impulse to go back to the "beginning."

Many times, but little consideration is given to the long period of evolution through which the art or science has passed, and the memory of the patient toilers who have handed the torch to those who came after, for the further enlightenment of the world, is dimmed, and their legacy—the result of arduous labor and unselfish thinking—becomes more or less a tradition. The facts become obscure, until, after a lapse of two or three generations, it is difficult to distinguish between fact and hearsay.

In the science of even so young a vocation as dentistry, authentic sources of information regarding the early history of its professional advancement are rare. I have availed myself of sources of information so inaccessible as to preclude previous research, and here present my findings to substantiate the fact that dentistry, as far as professional educational training is concerned, had its birth in the little village of Bainbridge, Ohio, in the year 1827.

Bainbridge was laid out in 1804 by Gen. Nathaniel Massie, a Virginian, who became very influential in the affairs of the Northwest Territory and acted in the capacity of surveyor in the making of entries of land for those holding warrants in this section, known as the Virginia Military District. He named the

village in honor of Commodore William Bainbridge, one of the nation's great naval heroes, whose wife was Mary Taylor, a relative of General Massie's friend, Joseph Taylor, four of whose sons became dentists and are referred to elsewhere in this article.

Soon after the town was laid out, Massie employed Jacob and John Rockhold, who had settled at the Falls of Paint Creek two years previously, to build a hewed log house, which was used as a store and was the first building on the town plat.

Paint Valley, in which this village lay, is just another of those valleys whose beauty is so characteristic of the scenery of Southern Ohio, receiving its name from the creek which follows a serpentine course throughout its entire length. It is bordered on the north and south by ranges of hills of appealing beauty. Its fertile fields, once covered by dense primeval forests, with an abundance of game, and its streams teeming with fish, no doubt had a strong appeal to prehistoric man in this vicinity, as did the Valley of the Scioto, into which Paint Valley opens its portal at Chillicothe.

Four miles west of the village are the Seven Caves, on Rocky Fork—at times, a turbulent branch of Paint Creek. The elements here throughout the centuries have wrought the curious formations so characteristic of all caverns found in sections with a subterrain of limestone and sandstone. Before the advent of the sturdy pioneers, this section is supposed to have been rather densely populated, and archeologic explorations in mounds near Bainbridge show a marked evidence of culture and an advancement in agricultural pursuits. A few miles from the village, on a commanding height, is Fort Hill; and a short distance farther, Serpent Mound, places of defense and of ceremonials, respectively; while some miles farther to the west on the watershed, between the Miami and the valleys to the east, is Fort Ancient, with a commanding position on one of the highest points, well fortified by high earthen breastworks, with stations from which fires signaled messages of good or evil, peace or war, throughout the tribal territory. This fort, which enclosed an area sufficient for cultivation, was a place of safe retreat during hostilities in those days of the long ago.

This historical background, associated with the lavish manner in which nature had beautified the environments of the village, must have been alluring to one with the studious inclinations of Dr. John Harris when he came to Bainbridge in 1825. Its peace and quietude furnished an ideal setting for the maturing of ideals which he had no doubt been fostering in his keen mind. He had been practicing as physician and dentist at Madison, Ohio, a post town in Hamilton County, only 10 miles from Cincinnati, which had a population of 12,016. From this fact, it is evident that he was more interested in the life and affairs of a small rural community than in those of a rapidly growing city.

It may be of interest to quote from the *Ohio Gazetteer* of 1837 relative to the population of the towns in which the activities I propose to narrate in this article took place.

In 1829, Bainbridge had about twenty-five dwelling houses, three stores, a forge and some mills. In 1830, it had a population of 279. In 1837,

> It contains two houses of public worship, both of brick, one school house, four retail stores, with a ware-house attached to each, four taverns, about 55 or 60 dwellings, 21 mechanics shops, 4 tanyards and about 400 inhabitants. In the immediate vicinity are 2 forges, a rolling and slitting mill and nail fac-

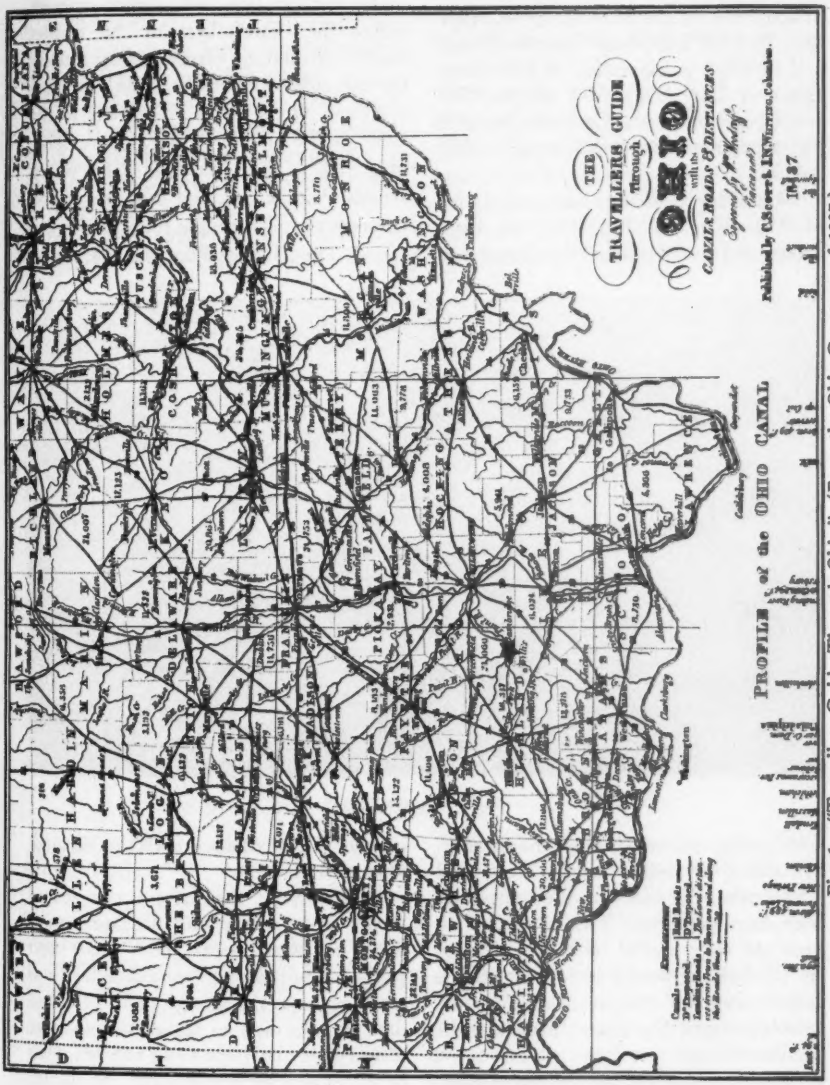


Fig. 1.—"Travellers Guide Through Ohio." (From the Ohio Gazetteer of 1837.)

tory, 2 flour mills, 4 saw mills and one distillery.

Chillicothe in 1829 had a population of about 2,600, and in 1830, 2,840. Hillsboro in 1829 had about sixty dwellings, and in 1833, a population of 600. Lancaster in 1829 had 1,500, and in 1833 could boast of 1,800. Columbus in 1829 had a population of 2,014, and in 1830, 2,430.

Bainbridge at present has a population of 750. The Milford Pike, the main artery of travel between Cincinnati and Chillicothe, passed through Bainbridge. Hillsboro, 23 miles to the west, and Chillicothe, 20 miles to the east, were both more populous. The latter, having been the state capital in 1800-1810 and in 1812-1816, would have furnished a larger clientele; but for reasons we are unable to state, Dr. Harris preferred the smaller village.

The photograph of the Village of Bainbridge is taken from the range of hills to the south, and for this we are indebted to Hugh Hedrick, a high school student at Bainbridge.

To the extreme left is the cemetery where the "forefathers of the hamlet sleep." Mountain Street, running along the east side of it, intersects Main Street one block to the north. The road to the right of the middle of the picture, leading north, is the Greenfield Pike, which crosses Paint Creek and takes its course through the picturesque hills in the distance. The Milford Pike, the main street of the village, passes directly through from east to west.

Fig. 2.—Bainbridge.

Itinerancy at the present time often savors of quackery, but at that period when the settlements were small and roads and modes of travel difficult, it was necessary for the practitioner of those days of long ago to travel through the countryside and from town to town, that he might procure a livelihood. No doubt, there were quacks in those days, but there was also a class of men with medical

training who had chosen to practice dentistry in conjunction with medicine, realizing its importance as a health measure. To membership in the latter class, John Harris could justly lay claim, as is evidenced by his unselfish career.

The office of John Harris in Bainbridge is still standing on Main Street, on the north-east corner of the alley west of Mountain Street and is owned by Mr. J. W. Steadman.

In a letter under date of Sept. 26, 1931, Mr. E. E. Rockhold, of Rockhold, Brown and Company, bankers of Bainbridge, states:

> With reference to the house in which Dr. Harris lived and practiced dentistry, I would say that my father has told me of it quite a number of times, and it is the one recently photographed by your brother Dr. C. W. Mills. My great-grandfather Joseph Rockhold came to this part of Ohio from Pennsylvania. He first settled on High Banks, below Chillicothe, where my grandfather was born, in 1801. He later settled in this neighborhood on Cove Run. My father, Elijah Rockhold, was born in Bainbridge and died here June 8, 1924, aged 81 years. My grandfather and father were both merchants here for quite a number of years.

For a village of its size, Bainbridge had its full quota of members of the medical profession. At the time Dr. Harris made his advent, we find in the *Supporter & Gazette,* published in Chillicothe, the following names of physicians located in Bainbridge: Benjamin Doddridge, Drs. Fletcher Wampler and Benjamin O. Carpenter, who had recently entered into partnership in the practice of "medicine and physic and surgery," and Dr. James B. Finley, "back of Mr. H. Turner's store," who had succeeded to the office of Dr. Kirker McCague, but recently deceased.

Fig. 3.—Dr. John Harris' residence and office in Bainbridge.

The dental profession—probably a misnomer as applied to dentistry of that day—was not represented. Chillicothe, at the time, had eleven or more physicians and its first resident dentist in the person of Joseph Giles Dunlap, who had studied with a Dr. Drummond of Louisville, Ky.

The name "Dunlap" was associated with dentistry in Chillicothe through three generations.

MEDICINE

The practice of medicine in Ohio, previous to 1811, was unrestricted. The state was admitted to the Union, Feb. 10, 1803, and the general assembly, at its ninth session, Jan. 14, 1811, created and established the first state medical society. The state was divided into five districts, and in each was appointed a board of three medical censors or examiners for the purpose of examining candidates for the practice of "physic, midwifery and surgery." The board met in June and November of each year. Fee for license was $5, and any person practicing without a license, could not collect accounts by law. In 1821, an act provided that the district of each court of common pleas should constitute a medical district, and, in each five censors were appointed to examine candidates under this act. The censors of each district sent one delegate to a convention held in Columbus, known as the medical convention of Ohio. The convention was the only body empowered to grant licenses, but the censors of a local district could issue a temporary permit, until the above-mentioned convention convened, and licenses were then granted by ballot.

In 1824, the Act of 1821 was repealed and a new act, creating twenty medical districts, was enacted which, among other provisions, made it obligatory that a candidate for examination *have received instruction under a preceptor.*

The only medical college in the state from 1819 to 1833 was the Medical College of Ohio, located in Cincinnati, which later was merged with the Miami Medical College to form the Medical Department of the University of Cincinnati. The nearest college out of the southern part of the state was the Medical Department of the Transylvania University of Lexington, Ky., organized in 1817. In 1850, it was removed to Louisville and became the Kentucky School of Medicine. In 1908, it became the Medical Department of the University of Louisville. Announcements of this college were published in the *Supporter & Gazette* during 1824.

DENTISTRY

Dentistry was being practiced without any legal restraint and was destined to continue so for some time, as it was many years before it received the consideration as a health measure which it merited. The success of some who had been in practice induced many incompetent and unqualified persons to enter its ranks, and the newspapers during these years contained many announcements of itinerant dentists, making extravagant claims as to their ability. The spirit of selfishness and secretiveness that prevailed among practitioners who did possess any knowledge and technical ability was a serious handicap to dental education and progress.

Dr. John Harris, from his experience in the practice of medicine, early realized the importance of a medicodental education for the successful practice of dentistry, fully recognizing its value in the treatment of conditions involving the general health. This is voiced in his writing of a later date.[1]

The medical colleges, so few in number, had more to teach than was possible in the two-year course prescribed, and it seemed impracticable to have a department of dentistry attached to these institutions.

1. Harris, John: Am. J. Dent. Sc., 6:100, 1845-1846.

Shortly after Dr. Harris had located in Bainbridge, devoting more than half his time to the practice of dental surgery and the remainder to the practice of medicine, James Taylor, who lived in the vicinity, entered his office as a student, no doubt to prepare himself as an applicant for examination by the censors of one of the district medical societies. John Harris' office at Madison, located at Greenfield, about 15 miles to the north of Bainbridge, for the practice of medicine. He had no doubt followed an itinerant practice before locating in Greenfield, as the *Supporter & Gazette,* in an issue of September, 1823, advertises among the list of letters uncalled for at Old Town, Ohio, one for Chapin Harris.

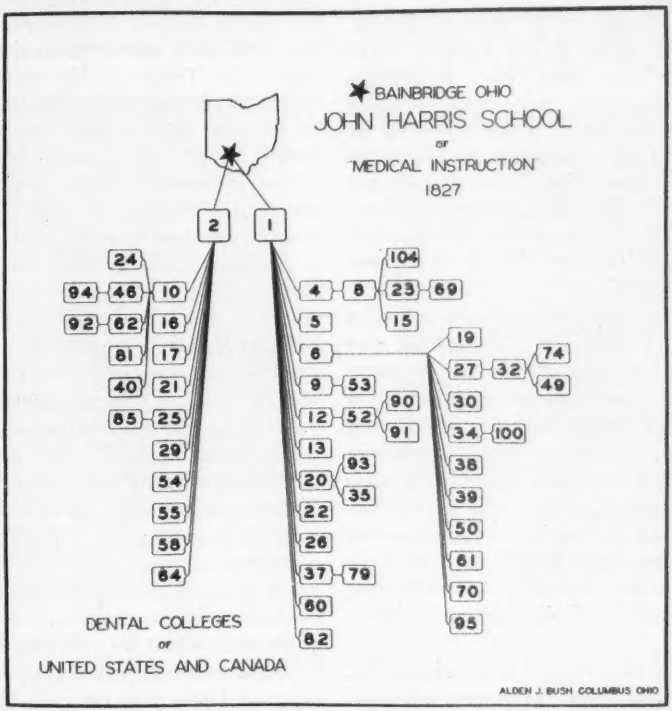


Fig. 4.—Order of establishment of dental colleges in United States and Canada. (See key in supplement, page 382.)

Whether influenced by his preceptor, or following the natural bent of his own mind, he became more interested in the dental phase of Dr. Harris' practice than in the medical.

Dr. Chapin A. Harris, a brother of John Harris, who had been a student in

Dr. Chapin Harris also became interested in dentistry. This was most fortunate in view of the ideals for dentistry in the mind of Dr. John Harris, for Chapin A. Harris and James Taylor were to carry on, in the not distant future and on a more pretentious scale,

those precepts which John Harris was to instil in their minds and those of others, from the school of instruction he was on the eve of establishing in this, the village of his adoption. Further, the effulgent rays of dental knowledge from his primitive school were to be diffused into every institution where dental science was to be taught throughout the ages that were to follow.

An obituary of Dr. Edward Taylor, published in the *Dental Register*,[2] states that he was born "near Bainbridge, which place might very properly be called the starting point of the following pioneers of the profession in the Mississippi Valley: Drs. John, James and Chapin A. Harris; Dr. Jones, formerly of Dayton, Ohio; Dr. Wampler of Illinois; Dr. Church of Baltimore; Drs. Joseph, James and Irwin Taylor."

The foregoing statement is from the pen of Dr. Jonathan Taft, at that time editor of the *Dental Register*. No member of the dental profession of that period was more familiar with dental literature than he; few, if any, were so zealous in publishing material or contributing material of interest to those who were to follow. He left a rich legacy of information concerning dental organizations and their activities and regarding the outstanding dentists of his day, their aims and achievements.

While his statement is significant, Dr. Taft passes over the matter with the mere mention of such names as had come to his attention as having been associated with Bainbridge. He graduated from the Ohio College of Dental Surgery in 1850, about twenty-five years after the time of the dental activities in this village, and these names no doubt had come to him through the Taylors, then practicing in Cincinnati, or possibly from the dentists themselves.

James Taylor was born March 25, 1809, and was but 16 years of age when he entered Dr. Harris' office as a student. It is very unlikely that Dr. Harris would discuss with one so young any plans he may have had in mind for securing students in the future, and it is highly probable that Dr. Taylor never did know that Dr. Harris resorted to announcements in the public press under "Medical Instruction." Dr. Taylor, in his remarks preceding an obituary of Dr. Harris,[3] refers to his rare qualities as a teacher, but makes no mention of any method he adopted, beyond the confines of the neighboring countryside, to make himself known as an instructor.

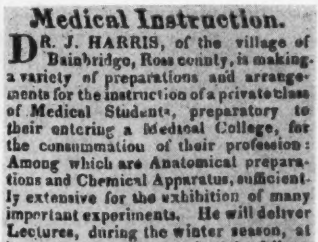
Dr. Harris had a wider vision than that of being preceptor to one or two students. He had a desire to enroll a sufficient number to make worth while the efforts he was prepared to put forth, and the plan he adopted explains why "Bainbridge was the starting point of so many pioneer dentists." Had his plans, methods and means been known to Drs. Taylor and Taft, they would have made a secure place in that galaxy of names that Ohio has given to dentistry, for the name of John Harris; and Bainbridge would have become a shrine of dentistry, as the place where his vitalizing impulse to dental education marked the first advance of dentistry to the rank of a profession.

The district medical societies created by the Act of 1824, requiring all candidates for examination by the board of censors to have had instruction under a *preceptor*, provided an opportunity for Dr. Harris to establish a school for medical instruction. Although he had devoted

2. Dent. Reg., 22:91, 1868.

3. Dent. Reg., 3:49-52, 1849-1850.

more than half of his time to the practice of dental surgery for more than ten years previous to 1830, according to his announcement in the *Ohio State Journal & Columbus Gazette,* issue of Oct. 14, 1830, a photographic copy of which is shown herewith, he was undaunted in his enthusiasm in meeting this opportunity. His experience as a physician and later as physician and dentist had convinced him of the importance of some medical instruction for the successful practice of dentistry, and such students as were to come under his instruction for the practice of medicine would, by virtue of this study, be better prepared for the practice of dentistry, should they elect to study it.



Medical Instruction.

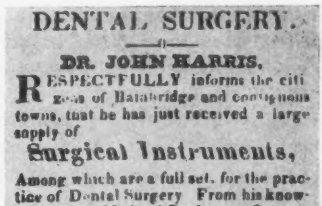
DR. J. HARRIS, of the village of Bainbridge, Ross county, is making a variety of preparations and arrangements for the instruction of a private class of Medical Students, preparatory to their entering a Medical College, for the consummation of their profession: Among which are Anatomical preparations and Chemical Apparatus, sufficiently extensive for the exhibition of many important experiments. He will deliver Lectures, during the winter season, at least once a week on each of the following branches, viz; Demonstrative Anatomy, Operative Surgery and Chemistry: and during the Summer season, he will devote as much of his time in lecturing on Osteology, Physiology, Materia Medica, Theory and Practice of Medicine and Obstetricks, as his professional avocations may permit; and every possible facility will be afforded to those who may see cause to patronise his efforts. No Student will be received who has not at least a first rate English education.—Terms of Tuition will be reasonable, depending on circumstances.

October 25, 1827. 35—6

Fig. 5.—Dr. John Harris' announcement appearing in the Supporter & Gazette, Chillicothe, Ohio, Nov. 1, 1827.

In furtherance of his plans, we find, in the *Supporter & Gazette,* published in Chillicothe, his announcement of medical instruction, a photographic copy of which is shown herewith. This announcement first appeared in the issue of Nov. 1, 1827, and last appeared in the issue of Dec. 6, 1827.

As far as my knowledge goes, this is the first announcement of professional lectures by an individual in the public press or elsewhere, and the only one by a physician and dentist who was himself to deliver lectures on the entire curriculum of medical subjects, and concurrently be devoting more than half his time to the practice of dental surgery. This school is in marked contrast to our present-day schools in that one teacher instructed in a variety of subjects, whereas now each teacher confines his instruction to one or possibly two subjects.



DENTAL SURGERY.

DR. JOHN HARRIS,

RESPECTFULLY informs the citizens of Bainbridge and contiguous towns, that he has just received a large supply of

Surgical Instruments,

Among which are a full set, for the practice of Dental Surgery From his knowledge of the Medical Profession, Surgery and Dental Surgery in particular, he flatters himself that he shall be able to render general satisfaction to all, who may have occasion to employ him He will set Artificial Teeth with much permanency and so natural in appearance, as to escape detection; and without that pain so consequent upon the operation, as performed by most Dentists—cure all cases of Scurvy of the Teeth—preserve those that are decaying, by plugging—extract all kinds of Teeth and Stumps, with ease; and perform every other operation of a Dental character.

Bainbridge, Feb. 7, 1828 52-tf

Fig. 6.—Dr. John Harris' announcement in Supporter & Gazette, Chillicothe, Ohio, first appearing in Feb. 21, 1828, issue and discontinued after Dec. 3, 1828.

The preliminary educational requirements specified in the announcement indicate that Dr. Harris was an advocate of higher standards than would be ex-

pected for that period, and to base an opinion on the qualifications and character of those of his students whose activities have come to our attention, he must have adhered strictly to such standards. Owing to the absence of data, it is impossible to estimate the number of students enrolled at Dr. Harris' school, or what percentage of them, intent on the practice of medicine, became more interested in dental surgery. In fact, the latter class is the only one of which we have information, which indicates that preparing students for the practice of dentistry was Dr. Harris' chief motive.

As further evidence of such a purpose, we find in the *Supporter & Gazette,* issue of Feb. 21, 1828, but two and one-half months after publication of his notice as medical instructor another announcement of Dr. Harris,' a photographic copy of which is shown herewith. (Fig. 6.)

This announcement was continued until the issue of Dec. 3, 1828.

The statement that he had "just received a large supply of Surgical Instruments, among which are a full set for practicing Dental Surgery" would indicate that he had installed an additional outfit for the use of his students, and the subsequent portion of his announcement was possibly intended to attract patients for the dental clinic that he was establishing in which to give technical instruction to his students. This is a reasonable presumption, since he had been practicing for at least seven years and no doubt had a sufficient armamentarium for his private practice.

We are convinced that Dr. Taft's list of dentists from Bainbridge did not include all of the students of Dr. Harris' school; in fact, they seem to have come from remote sections. In a biographic sketch of Dr. Edward P. Church, Chapin A. Harris states:

> Dr. Church was born in Middlesex, N. Y., March 3, 1805, and at about the age of seventeen commenced the study of medicine, which he pursued with great zeal for upwards of four years. During the last two years of his studentship he was under the tuition of the author and his brother Dr. John Harris, and devoted a considerable portion of his time to Dental Surgery, upon the practice of which, after having completed his medical education, he immediately entered.[4]

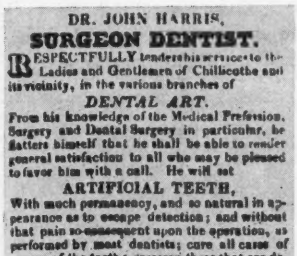
From these data, it may be deducted that Dr. Church was a student as late as 1826-1828, at which time Dr. Harris had his school in full operation in Bainbridge. It may be of interest that Dr. Church invented forceps for extracting the upper third molar, which, in 1849, were used by the majority of dentists in the United States. Dr. Church practiced in Natchez, Miss., Memphis, Tenn., Kentucky and western New York State. He died in New York State of cholera, July 22, 1832, thirty-six years prior to the reference by Dr. Taft to the dentists of Bainbridge.

Dr. John Allen, pioneer in porcelain dental art, was another student at Bainbridge not included in Dr. Taft's list. He was born in New York State, Nov. 4, 1810. For many years, his father was a practicing physician in Cincinnati, Ohio. Dr. B. L. Thorpe, in his "Biographies of Pioneer American Dentists and Their Successors" (1909) states that "at the age of nineteen (1829), he became a student of Dr. John Harris of Chillicothe . . . after a pupilage of one year he removed to Cincinnati." Dr. Thorpe is in error as to the place, as Dr. Harris was conducting his school in Bainbridge in 1829, and did not locate in Chillicothe until May, 1830, his first announcement appearing in the *Supporter*

4. Harris, C. A.: Dictionary of Dental Science, Biography, Bibliography and Medical Terminology, Ed. 1, Philadelphia: Lindsay & Blakiston, 1849, p. 134.

& Gazette, May 26, 1830, a photographic copy of which is shown herewith. (Fig. 7.)

Undoubtedly, inspiration and instruction were received in this primitive school by others whose names have been lost to history, but who, in their humble and earnest manner, nevertheless imparted to less fortunate members of the vocation the precepts and principles which Dr. Harris had instilled in them, all of which were to redound to the unsung praise of this unselfish promoter of dental science.



DR. JOHN HARRIS,
SURGEON DENTIST.
RESPECTFULLY tenders his services to the Ladies and Gentlemen of Chillicothe and its vicinity, in the various branches of
DENTAL ART.
From his knowledge of the Medical Profession, Surgery and Dental Surgery in particular, he flatters himself that he shall be able to render general satisfaction to all who may be pleased to favor him with a call. He will set
ARTIFICIAL TEETH,
With such permanency, and so natural in appearance as to escape detection; and without that pain so consequent upon the operation, as performed by most dentists; cure all cases of scurvy of the teeth; preserve those that are decaying, by plugging; extract all kinds of teeth and stumps with ease, and perform every other operation of a
DENTAL CHARACTER.
HIS OFFICE IS AT HIS RESIDENCE ON SECOND STREET.
DR. HARRIS
Pledges himself that all operations shall be performed in a style of neatness, elegance and durability, not to be surpassed in the United States. His charges will be moderate.
May 26. 14-3w

Fig. 7.—Dr. John Harris' announcement appearing in the Scioto Gazette in May, 1830.

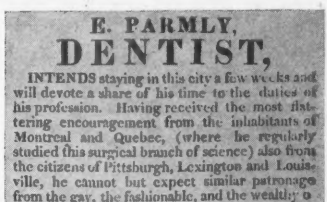
DENTISTS IN CINCINNATI, OHIO, 1816 TO 1825

Dr. James Taylor, in an obituary of Dr. John Harris,[5] states: "In dental surgery, Dr. Harris was principally his own instructor . . . he obtained from an itinerating dentist some knowledge of the constructive branches of the profession." Being established in the practice of medicine at Madison, but 10 miles from Cincinnati, he was no doubt attracted by the announcements of itinerant dentists who visited that place previous to 1825, the year he removed to Bainbridge.

An examination of the Cincinnati newspapers previous to this date, furnishes some information regarding the dentists who visited there during these years.

T. ETHERIDGE

In the *Liberty Hall & Cincinnati Gazette,* issue of July 1, 1816, T. Etheridge, Dentist, informs the ladies and gentlemen of that place that he will tarry a short time at Mrs. Emerlong's, Main Street. He calls attention to the teeth, both natural and artificial, and touching upon the importance of their care, remarks: "Suffice it to say that no fashionable person will neglect so important a part of cleanliness." The issue of November 4, of the same year, reports the suicide of T. Etheridge, by morphin, as having occurred October 29, and that "he was in the prime of life, skillful in his profession, leaving a young widow but no children."



E. PARMLY,
DENTIST,
INTENDS staying in this city a few weeks and will devote a share of his time to the duties of his profession. Having received the most flattering encouragement from the inhabitants of Montreal and Quebec, (where he regularly studied this surgical branch of science) also from the citizens of Pittsburgh, Lexington and Louisville, he cannot but expect similar patronage from the gay, the fashionable, and the wealthy o this young and flourishing metropolis.
Application to be made at his lodgings at Mrs. *Burley's,* Main street.
November 3, 1817. 85-tf

Fig. 8.—Dr. Eleazar Parmly's announcement appearing in the Liberty Hall & Cincinnati Gazette, Nov. 3, 1817.

E. PARMLY[5]

The same paper, Nov. 3, 1817, pub-

5. For biography, see Thorpe, B. L.: Biographies of Pioneer American Dentists and Their Successors, in Koch, C. R. E.: History of Dental Surgery, Vol. II, Chicago: National Art Publishing Co., 1909, p. 81.

lished an announcement of Eleazar Parmly, as shown in Figure 8.

This announcement was discontinued with the issue of December 18 the same year. The following appears May 6, 1818:

E. PARMLY

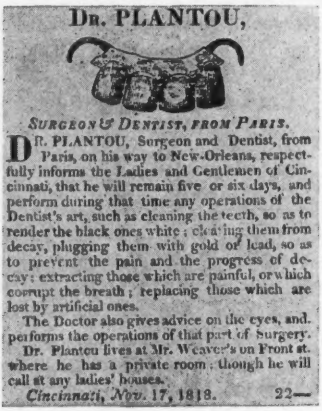
DENTIST

Will execute in the line of his profession, in Cincinnati, until the fifteenth of May. Application to be made at his lodgings at Mrs. Burley's, Main Street.

April 29, 1818.

DR. PLANTOU

The *Cincinnati Advertiser* of Nov. 17,



DR. PLANTOU,

SURGEON & DENTIST, FROM PARIS.

DR. PLANTOU, Surgeon and Dentist, from Paris, on his way to New-Orleans, respectfully informs the Ladies and Gentlemen of Cincinnati, that he will remain five or six days, and perform during that time any operations of the Dentist's art, such as cleaning the teeth, so as to render the black ones white; clearing them from decay, plugging them with gold or lead, so as to prevent the pain and the progress of decay; extracting those which are painful, or which corrupt the breath; replacing those which are lost by artificial ones.

The Doctor also gives advice on the eyes, and performs the operations of that part of Surgery.

Dr. Plantou lives at Mr. Weaver's on Front st. where he has a private room; though he will call at any ladies' houses.

Cincinnati, Nov. 17, 1818. 22—

Fig. 9.—Dr. Plantou's announcement appearing in the Cincinnati Advertiser, Nov. 24, 1818.

1818, and the *Liberty Hall & Cincinnati Gazette* of Nov. 24, 1818, carried an announcement of Dr. Plantou. The former paper, in the issue of November 24, carries the same announcement, enhanced by a cut, a photograph of which is here shown. (Fig. 9.)

The cut of the four incisors with clasps for attachment to the cuspids is significant, showing that the French appealed to the esthetic early in their restorations.

DR. SOMERBY

The *Western Spy & Cincinnati General Advertiser* of May 15, 1819, published the announcement of Dr. Rufus Somerby:

DR. SOMERBY

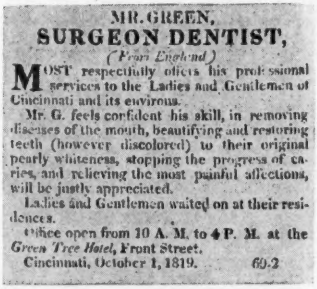
SURGEON DENTIST

Tenders his Professional services to the ladies and gentlemen of Cincinnati, etc. Operates for every disease incident to the teeth and gums, and inserts natural and artificial teeth from one to a full set.

His room is at Mrs. Gibson's boarding house, No. 20 Main Street, nearly opposite the Farmers and Merchants Bank.

May 1, 1819. 56 t.f.

The same paper, Sept. 14, 1822, published his announcement as surgeon den-



MR. GREEN,

SURGEON DENTIST,

(From England)

MOST respectfully offers his professional services to the Ladies and Gentlemen of Cincinnati and its environs.

Mr. G. feels confident his skill, in removing diseases of the mouth, beautifying and restoring teeth (however discolored) to their original pearly whiteness, stopping the progress of caries, and relieving the most painful affections, will be justly appreciated.

Ladies and Gentlemen waited on at their residences.

Office open from 10 A. M. to 4 P. M. at the *Green Tree Hotel*, Front Street.

Cincinnati, October 1, 1819. 69-2

Fig. 10.—Announcement of Mr. Green appearing in the Liberty Hall & Cincinnati Gazette, Oct. 8, 1819.

tist, "Member of the Medical Society in New Orleans," and stated that he would remain for four weeks only. "Office . . . Corner Broadway and Columbia Streets."

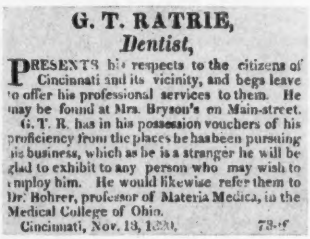
Dr. Somerby visited Cincinnati about the time Dr. John Harris became interested in dentistry. If these two came into personal professional contact, it must have been most fortunate for both. Dr. Somerby was the caliber of man to enthuse Harris as to the possibilities of dentistry; and also had the character and professional ability which destined him

to a high rank among the pioneer dentists of the Mississippi Valley.

Much information is obtained of him from an obituary notice in the *Dental Register*[6]*:*

He was born at Newburyport, Mass., Jan. 9, 1791. His father, though an Englishman, served for the cause of the Colonies in the Revolution, and was detailed for guard duty around the scaffold upon which the intrepid André paid the death penalty.

As a boy he had a desire to follow the sea, but his sailor life was confined to one voyage to Europe; when the War of 1812 so interfered with the commerce of New England, he abandoned the sea forever. Being in delicate health he established himself in some mercantile pursuit in Alexandria, and later removed to Georgetown, D. C. Here he became acquainted with Dr. Durroux, a prominent dentist, and placed himself under his tutelage.



G. T. RATRIE,
Dentist,

PRESENTS his respects to the citizens of Cincinnati and its vicinity, and begs leave to offer his professional services to them. He may be found at Mrs. Bryson's on Main-street.

G. T. R. has in his possession vouchers of his proficiency from the places he has been pursuing his business, which as he is a stranger he will be glad to exhibit to any person who may wish to employ him. He would likewise refer them to Dr. Bohrer, professor of Materia Medica, in the Medical College of Ohio.

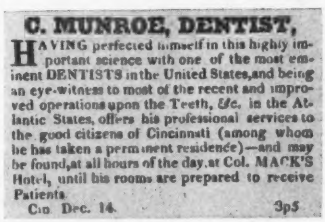
Cincinnati, Nov. 13, 1820. 73-tf

Fig. 11.—G. T. Ratrie's announcement in the Liberty Hall & Cincinnati Gazette, Dec. 2, 1820.

Later, he practiced successfully in the South and West as an itinerant. We find an announcement of his in a newspaper of Staunton, Va., July 10, 1818, and in May of the following year, in Cincinnati. Later, he located in New Orleans, where he remained seven years. On account of his health, he was forced to leave and in 1828 returned to Cincinnati, where he enjoyed a wide reputation and stood deservedly in the front rank among the members of the dental profession. In 1835, he removed to Louisville, Ky., where he practiced until his death, Jan. 26, 1858.

He was elected a member of the Mississippi Valley Association of Dental Surgeons in September, 1851, and was chosen president at the same meeting. He invented a blow-pipe, illustrated in the *American Journal of Dental Science.*[7]

The dentists of Louisville passed suitable resolutions at his death, in which he was paid the following tribute: "He enjoyed the respect of the community in which he lived and was beloved by all who knew him. We leave his name to be cherished by the hearts of the many who were wont to meet his sympathy, and receive his aid in the troubles that bestrew life's pathway."



C. MUNROE, DENTIST,

HAVING perfected himself in this highly important science with one of the most eminent DENTISTS in the United States, and being an eye-witness to most of the recent and improved operations upon the Teeth, *&c.* in the Atlantic States, offers his professional services to the good citizens of Cincinnati (among whom he has taken a permanent residence)—and may be found, at all hours of the day, at Col. MACK'S Hotel, until his rooms are prepared to receive Patients.

Cin. Dec. 14. 3p5

Fig. 12.—C. Munroe's announcement in the Liberty Hall & Cincinnati Gazette, Dec. 21, 1824.

MR. GREEN
(FROM ENGLAND)

The *Liberty Hall & Cincinnati Gazette,* issue of Oct. 8, 1819, published the announcement shown in Figure 10.

In the *Literary Cadet,* Nov. 29, 1819, in addition to his usual announcement, Mr. Green says: "Children's teeth regulated."

The *Cincinnati Western Spy* of March 20, 1820, contains an advertisement of Durrels' Lotion for the teeth, and cure for scurvy of the gums.

6. Dent. Reg., 11:359, 1857-1858.

7. Somerby, Rufus: Am. J. Dent. Sc., 5:226, First Series, 1844-1845.

G. T. RATRIE

The *Liberty Hall & Cincinnati Gazette* on Dec. 2, 1820, published the announcement of Dr. Ratrie shown in Figure 11.

He announced his return on April 18, 1823, and again on May 14, 1824, with an M.D. attached to his name, a degree not used in his previous announcements.

GEORGE W. HUBLEY

The *Cincinnati Advertiser* of Feb. 18, 1824, announces "George W. Hubley, Dentist, who will remain a few weeks."

James Whittaker,
DENTIST,
(Late assistant to Mr. Parmly, of New-Orleans)

INTENDS devoting the greater part of his time to his professional practice, which is precisely on the highly approved plan of Mr. *Parmly*. According to the improvements of that gentleman, artificial TEETH are fixed, without the aid of Ligature, or any Metallic substance, and in so periect a manner, as at once to elude detection.

Every other dental operation performed with the greatest care and attention, and under the advantage of those important and skilful improvements, for which every person acquainted with Mr. Parmly's method, have given him the most grateful commendation. The terms are so moderate as to constitute no reasonable objection.

J. Whittaker may be consulted at his Room, from 9 A. M. to 3 P. M. at Mr. Watson's Hotel, sign of the Golden Lamb, for a few days.

Chillicothe, Nov. 15. 31

Fig. 13.—James Whittaker's announcement in the Chillicothe Times, Nov. 24, 1824.

His announcements appeared with regularity during this period.

C. MUNROE

The *Liberty Hall & Cincinnati Gazette,* in the issue of Dec. 21, 1824, published an alluring announcement. (Fig. 12.)

In 1825, he had the rooms formerly occupied by Dr. Ratrie, 7 Broadway.

JAMES WHITTAKER

The *Chillicothe Times* of Nov. 24, 1824, published an announcement, photographic copy of which is here presented. (Fig. 13.)

While we have no evidence of Whittaker's practicing in Cincinnati on his journey north from New Orleans, it is quite probable that he gave "the gay, the fashionable and the wealthy" of that "flourishing metropolis" the benefit of his knowledge, obtained while assistant to Dr. Parmly, in which event, Dr. John Harris may have had opportunity to further his knowledge of Dr. Parmly's methods.

From the foregoing announcements, it is evident that Dr. John Harris had the opportunity to study the known methods of technical procedure of that day, the

DENTISTRY.
JOHN HARRIS, M. D.
DENTIST,
Member of the American Society of Dental Surgeons,

TAKES this method of informing his friends and acquaintances that he has returned to Chillicothe, for the purpose of practising his profession, and is amply prepared to attend to all cases pertaining thereto. His stay will depend entirely upon the demands for his services. No reference is deemed necessary, as he is so generally known. Dr. H. is prepared to put in full or entire sets of teeth, and warrant them to subserve the purpose of original teeth, for mastication or no charge will be made.

He may be found at Mrs. Houghton's, Second St., a few doors below Col. Madeira's Hotel.

July 21, 1842. 15tf

Fig. 14.—Dr. John Harris' announcement as a member of the American Society of Dental Surgeons; published in the Scioto Gazette, July 21, 1842.

French through Dr. Plantou or, more probably, the system of Dr. Durroux, through his pupil Dr. Somerby; the English through Dr. Green, and last but not least, dentistry as practiced by the dentists in the New England States, through Eleazar Parmly or C. Munroe.

Basing our opinion on the testimony of his contemporaries concerning Dr. Harris' thoroughness as a student, we would conclude that each system as practiced by these itinerant dentists received his closest investigation, and, on the final analysis of these studies, he adopted a technical procedure which in his opinion

was calculated to produce the most beneficial results.

Referring to the "Pioneers of the Dental Profession of the Mississippi Valley," Dr. Taft mentioned "Drs. John, James and Chapin A. Harris."

JOHN HARRIS

John Harris (1798-1849) was the founder of the School of Medical Instruction.[8]

Dr. Harris was married, Nov. 12, 1827, to Mrs. Martha Edmiston Wampler, widow of Dr. Fletcher Wampler of Bainbridge, whom she had married in Chillicothe, Oct. 28, 1824.

In 1830, Dr. Harris moved from Bainbridge to Chillicothe. He removed to Kentucky in 1834. He was unsuccessful in an effort in 1836 to obtain a charter from the legislature for a dental college in Kentucky. He practiced in Louisville, Frankfort and Georgetown until 1845, when he was succeeded by Dr. Cyrenius O. Cone, a graduate of the Baltimore College of the same year. Dr. Cone was recommended as "a man of moral and professional worth" through the newspapers by Dr. Harris. Dr. Cone remained in Georgetown until the fall of 1846, when he became demonstrator of prosthetic dentistry in his alma mater.[9]

In the *Scioto Gazette* of March 4, 1842, appears the following announcement under "Dentistry":

Dr. John Harris, Dentist, formerly of this city, at the solicitation of many of his friends and acquaintances, has come to the determination to return to Chillicothe some time in May or June next for the purpose of attending to all the calls in the line of his profession.
Chillicothe, March 4, 1842.

In the issue of the *Scioto Gazette* of July 21, 1842, appears his announcement as a member of the American Society of Dental Surgeons. (Fig. 14.)

JAMES H. HARRIS

Thorpe is in error in "Biographies of Pioneer American Dentists," page 66, in stating that "James H. Harris became a clergyman." He studied medicine with his brother John Harris while at Madison.

James H. Harris, brother of John Harris, formerly of Madison, Ohio, located in Columbus, Ohio, in 1822, as per his announcement published in the *Columbus Gazette*, issue of March 21, 1822, as follows:

DR. J. H. HARRIS

Hereby informs the public that (having long since made choice of this town, for his permanent place of residence, and having now moved to the same) he will as far as possible, attend to all calls in the line of his profession. His office and residence is on the east side of High Street, first door south of the State House.

N.B. Dr. Harris and Mr. Jerome design to keep constantly on hand at the Laboratory formerly owned by R. Hart and Co. on Broadway, north of the Public Square, a general supply of Copperas, Paints, Acids, Ethers and Dr. Sourins Rheumatic Oil and Cerate that has been so justly celebrated in many parts of the world for the cure of Rheumatism and chronic diseases of almost every description.
Columbus, March 18, 1822.

His residence in Columbus was evidently of short duration, as the *Columbus Gazette* of Oct. 17, 1822, published in a list of letters unclaimed at the post office, Oct. 1, 1822, one addressed to "James H. or Chapin Harris."

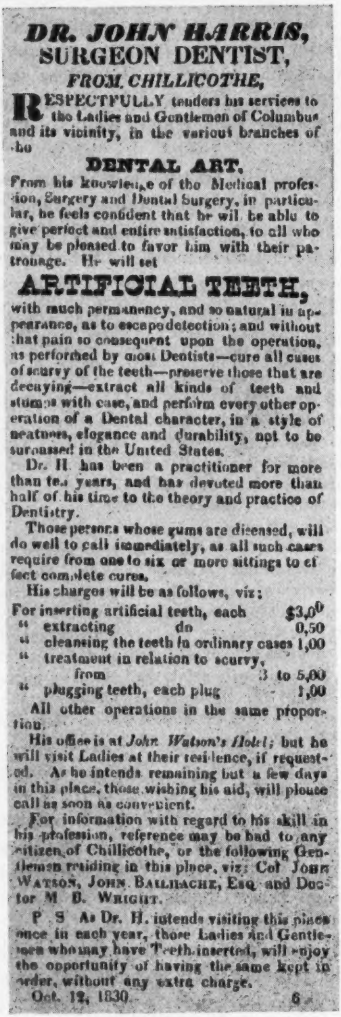
The *Lancaster Gazette* of June 5, 1827, mentions a meeting of the Medical Society of the 13th District and among the officers elected was: "James H. Harris, Treasurer."

In the same paper, the issue of Dec. 30, 1828, is the announcement that he

8. Biographic sketches: Bull. Ohio State Dent. Soc., pp. 106-111 (May) 1927; Dent. Cosmos, 71:1074-1081 (Nov.) 1929; Tr. A.D.A., 1930, pp. 201-207; Footnote 3.

9. Footnote 5, p. 266.

has *resumed* and will at all times promptly attend to the practice of "Physic, Surgery and Midwifery, and has removed to the late residence of Dr. McNeil, Broadway, near the Market House."



DR. JOHN HARRIS,
SURGEON DENTIST,
FROM CHILLICOTHE,

RESPECTFULLY tenders his services to the Ladies and Gentlemen of Columbus and its vicinity, in the various branches of the

DENTAL ART.

From his knowledge of the Medical profession, Surgery and Dental Surgery, in particular, he feels confident that he will be able to give perfect and entire satisfaction, to all who may be pleased to favor him with their patronage. He will set

ARTIFICIAL TEETH,

with much permanency, and so natural in appearance, as to escape detection; and without that pain so consequent upon the operation, as performed by most Dentists—cure all cases of scurvy of the teeth—preserve those that are decaying—extract all kinds of teeth and stumps with ease, and perform every other operation of a Dental character, in a style of neatness, elegance and durability, not to be surpassed in the United States.

Dr. H. has been a practitioner for more than ten years, and has devoted more than half of his time to the theory and practice of Dentistry.

Those persons whose gums are diseased, will do well to call immediately, as all such cases require from one to six or more sittings to effect complete cures.

His charges will be as follows, viz:

For inserting artificial teeth, each	$3,00
" extracting do	0,50
" cleansing the teeth in ordinary cases	1,00
" treatment in relation to scurvy, from	3 to 5,00
" plugging teeth, each plug	1,00

All other operations in the same proportion.

His office is at *John Watson's Hotel;* but he will visit Ladies at their residence, if requested. As he intends remaining but a few days in this place, those wishing his aid, will please call as soon as convenient.

For information with regard to his skill in his profession, reference may be had to any citizen of Chillicothe, or the following Gentlemen residing in this place, viz: Col JOHN WATSON, JOHN. BAILHACHE, Esq. and Doctor M. B. WRIGHT.

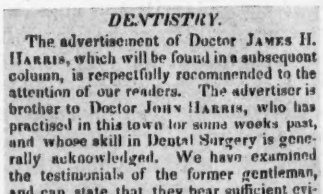
P. S. As Dr. H. intends visiting this place once in each year, those Ladies and Gentlemen who may have Teeth inserted, will enjoy the opportunity of having the same kept in order, without any extra charge.

Oct. 12, 1830. 6

Fig. 15.—Dr. John Harris' announcement appearing in the Ohio State Journal & Columbus Gazette, Oct. 14, 1830.

The same card appears early in the following year, but his name is not included in the list of members of the 13th District Medical Society, published in the *Gazette* of June 2, 1829; and no further mention is found of him as a physician.

The announcement of Dec. 30, 1828, indicates a previous absence from Lancaster, and indicates to my mind that, during this period of absence, he was attending the school of John Harris at Bainbridge, receiving instruction in dental surgery, in the latter part of 1827 and the greater portion of 1828, as the first announcement of the school was made in November, 1827; and in March, 1828, John Harris had equipped his school with "A larger supply of surgical instruments, among which are a full set for practicing Dental Surgery."



DENTISTRY.

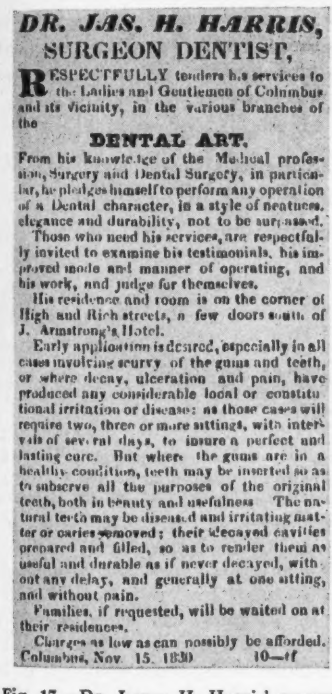
The advertisement of Doctor JAMES H. HARRIS, which will be found in a subsequent column, is respectfully recommended to the attention of our readers. The advertiser is brother to Doctor JOHN HARRIS, who has practised in this town for some weeks past, and whose skill in Dental Surgery is generally acknowledged. We have examined the testimonials of the former gentleman, and can state that they bear sufficient evidence of his correct deportment and professional ability, to justify the confidence of those who may be pleased to avail themselves of his services as a Dentist.

Fig. 16.—Notice of Dr. James H. Harris' announcement appearing in the Ohio State Journal & Columbus Gazette, Nov. 18, 1830.

As John Harris had been devoting more than one-half of his time to the practice of dental surgery since 1820, as shown by the foregoing advertisement, undoubtedly he had in 1827 a sufficient armamentarium for his private practice, and this "larger supply" would indicate that he had established a clinic in connection with his lectures.

In confirmation of the statement above that James H. Harris was a dentist instead of a clergyman, the item shown in Figure 16 appeared in the same issue as James H. Harris' announcement, Nov. 18, 1830.

Dr. James H. Harris, shortly after his return to Lancaster in December, 1828, devoted his time exclusively to dentistry. He spent the major portion of his time in



DR. JAS. H. HARRIS,
SURGEON DENTIST,

RESPECTFULLY tenders his services to the Ladies and Gentlemen of Columbus and its vicinity, in the various branches of the

DENTAL ART.

From his knowledge of the Medical profession, Surgery and Dental Surgery, in particular, he pledges himself to perform any operation of a Dental character, in a style of neatness, elegance and durability, not to be surpassed.

Those who need his services, are respectfully invited to examine his testimonials, his improved mode and manner of operating, and his work, and judge for themselves.

His residence and room is on the corner of High and Rich streets, a few doors south of J. Armstrong's Hotel.

Early application is desired, especially in all cases involving scurvy of the gums and teeth, or where decay, ulceration and pain, have produced any considerable local or constitutional irritation or disease: as those cases will require two, three or more sittings, with intervals of several days, to insure a perfect and lasting cure. But when the gums are in a healthy condition, teeth may be inserted so as to subserve all the purposes of the original teeth, both in beauty and usefulness. The natural teeth may be cleansed and irritating matter or caries removed; their decayed cavities prepared and filled, so as to render them as useful and durable as if never decayed, without any delay, and generally at one sitting, and without pain.

Families, if requested, will be waited on at their residences.

Charges as low as can possibly be afforded.

Columbus, Nov. 15, 1830. 10—tf

Fig. 17.—Dr. James H. Harris' announcement appearing in the Ohio State Journal & Columbus Gazette, Nov. 18, 1830.

Lancaster, but made occasional trips elsewhere, as is shown by the announcement copy of which appears in Figure 17.

Later, he went to Baltimore, Md., and there he died, Oct. 24, 1836.[10]

10. Footnote 4, p. 358.

CHAPIN A. HARRIS
(1806-1860)

Space will not permit a review of the career and achievements of Chapin A. Harris, organizer of the first dental college, at Baltimore, editor of the first dental journal *(American Journal of Dental Science)* and prolific author.

At a meeting of the dentists in New York City, Oct. 8, 1860, of which Eleazar Parmly was chairman and Solymon Brown secretary, under the "Harris Testimonial Fund" the preamble and resolutions pay him the following tribute:

Every distinct profession in human society has its leading members, men of energy, talent and eminence. This is true of the dental profession as of any other, and not less true in America than in other quarters of the globe. The names of Greenwood, Woofendale, Gardette, Hayden, Flagg, Hudson, Koecker and Randall among others that have left their sublunary labors, are evidence of this fact.

It has become our melancholy duty in pursuance of the object of this meeting, to add another name to this catalogue, more highly distinguished than any of his predecessors for numerous and valuable contributions to the science and literature of his profession, as well as by his writings, as by personal inculcations as head of the oldest, and for many years, the only dental college in the world.[11]

I recall, while a student in the office of the late Dr. F. H. Rehwinkel, of Chillicothe, the pleasure it was to Dr. Rehwinkel to relate the cordial reception given to him by Dr. Harris when, in 1854, he matriculated in the Baltimore College of Dental Surgery. Dr. Harris referred to the fact that Chillicothe was only a few miles from Bainbridge.

DR. JONES, "FORMERLY OF DAYTON"

Dr. John Jones was born in 1795 and died at Dayton, Ohio, Sept. 11, 1850, having practiced about twenty years.

11. Dent. Cosmos, 2:221, 1861. Biographic references: Dent. Cosmos. 2: 274-279, 1860; Am. J. Dent. Sci., 10:588-591, 1860; Dent. Reg., 15:79-90, 1861.

Shortly after entering practice, he located in the Miami Valley, and he practiced in Miamisburg and in neighboring towns, removing to Dayton about 1840-1842. He maintained a high standing in his profession and only those who knew him well could appreciate his private worth. He received an honorary D.D.S. from the Ohio College of Dental Surgery.

A friend in Dayton, writing of his death, said: "A man highly esteemed both in professional and private life, his loss is no doubt felt by more of the citizens than would be the loss of any other citizen, either public or private."[12]

He is buried with his wife, Susan M. Jones (1808-1884), and his sons William S. and Capt. James E. Jones, in Woodland Cemetery, Dayton, Ohio.

William S. Jones (1836-1883) was for many years first assistant clerk of the police court in Cincinnati.

Capt. James E. Jones deserves more than passing notice. He was born at Miamisburg, Jan. 31, 1835. In 1852, he began the study of dentistry with Dr. Taylor in Cincinnati, and, in 1855, he graduated from the Ohio College of Dental Surgery. After practicing one year with Dr. W. H. Goddard of Louisville, Ky., he returned to Dayton and continued in practice. He took an active interest in dental affairs, becoming a member of the Mad River Valley Dental Society, Oct. 4, 1860.

In 1861, at the outbreak of the Rebellion, with the "Dayton Light Guard" he answered the first call of President Lincoln in the First Ohio Regiment, serving from April to July, 1861. Reenlisting Aug. 12, 1861, with a commission of first lieutenant in the same regiment, he was soon promoted to captain and, at the head of his company, participated in some of the most sanguinary battles in the South. He was mustered out Sept. 1, 1864. After an imperiled service of four years, it was his sad fate to meet a violent death in the burning of Pike's Opera House in Cincinnati, Thursday evening, March 22, 1866. At the time that he received his injuries, he was assisting in removing goods from the office of the Adams Express Company, where he was crushed by the falling of the cornice.

It was said of him: "He was a man of personal excellence, intelligent in military affairs, brave in battle and possessed of noble qualities of head and heart."[13]

12. Dent. Reg., 4:51, 1850.

DR. WAMPLER, OF ILLINOIS

Dr. Wesley Wampler was born in Virginia, Oct. 25, 1806, and died at Humboldt, Ill., July 27, 1875. His parents were Joseph and Sarah (Stevens) Wampler of Virginia, who later resided at Oakland and Paris, Ill. They were also the parents of Newton, who died in infancy, and Fletcher Wampler, a physician at Bainbridge, Ohio, who was born May 16, 1804; married Martha Edmiston of Chillicothe, Ohio, Oct. 28, 1824, and died at Bainbridge in 1827. His widow married Dr. John Harris, Nov. 12, 1827.

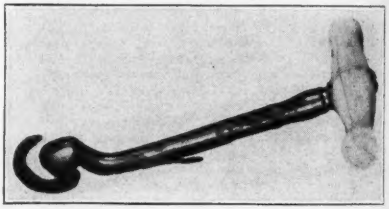


Fig. 18.—Instrument with which Dr. Wesley Wampler removed a tooth for Abraham Lincoln some time during 1856 while at Milton Station, Ill.

13. Dayton Daily Journal, March 27, 1866; Cincinnati Gazette, March 27, 1866.

Dr. Wesley Wampler also studied dentistry and medicine in Baltimore, Md., and as a pioneer "practiced on horseback in Ohio, Illinois and Wisconsin," settling at Milton Station, now Humboldt, Coles County, Illinois, in the year 1840, and continued to practice until about 1868. While he was practicing at Milton Station, Abraham Lincoln, on his way to Chicago, had him remove a tooth, the first he had had extracted by a dentist. This was done some time during 1856. A photograph of the instrument used is shown in Figure 18.

Dr. Wampler retired from practice about 1868, and with his father was commissioned by the government as surveyor for southern Michigan. The compass and chain used by them are in the Henry Ford Museum at Dearborn, Mich.

Dr. Wesley Wampler married at Pinhook, Ill., in 1834, Mahala Longnecker (March 30, 1817-Sept. 23, 1889) of Maysville, Ky. They were the parents of five children: Matilda and Isabel, who died in childhood, Joseph F. (Oakland, Ill., 1846-1930), Thomas Wesley (Paris, Ill., 1850-1905) and Lawrence A. Wampler, who was born at Sheboygan, Wis., March 28, 1858, now residing at Richmond, Va. To Lawrence A. Wampler and Miss Emma M. Wampler, of Chicago, I am indebted for much of the foregoing information.

DR. CHURCH, OF BALTIMORE

Dr. Samuel T. Church, Baltimore, Md., according to the Baltimore city directory, was in 1858-1859 located at 51 N. Charles Street; in 1860, at the northeast corner of Charles and Lexington Streets, and in 1863-1864, at 87 N. Charles Street. No reference to him appears previous to nor subsequent to the foregoing dates and at this writing no further information is available regarding him.

DRS. JOSEPH, JAMES AND IRWIN TAYLOR

This name "Taylor" is so closely identified with the early annals of American dentistry, and about the members of this family so much has been written, it would be redundant to offer more than a biographic citation.

The Taylor family is closely associated with the settlement of the Paint Valley. It is of interest to note that the Ohio pioneer of the family was William Taylor, a Revolutionary soldier, native of New Jersey, who, with his wife, Lucy Imlay, settled about one mile from the present site of Bainbridge, in 1800. He died April 24, 1830. The *Scioto Gazette* of May 19, 1830, states that he left fourteen children, one hundred and twenty-four grandchildren and seventy-five great-grandchildren. Their oldest son, Joseph Taylor (Sept. 27, 1770-Aug. 25, 1830), married Aug. 8, 1797, Jane Irwin (Aug. 25, 1779-Oct. 19, 1847) in Kentucky, where his father had settled temporarily, and came to Paint Valley with the other members of the family in 1800.

They were the parents of seven sons and two daughters. Four of the sons became dentists: Joseph (Sept. 23, 1806-May 12, 1873)[14]; James (March 25, 1809-June 12, 1881)[15]; Edward (Feb. 17, 1811-Feb. 26, 1868)[16]; Irwin (July 15, 1813-April 4, 1843). I am unable to cite an obituary of Dr. Irwin Taylor, but the following information was obtainable:

In 1838, Irwin Taylor assumed charge of a dry goods business in Bainbridge which Dr. James Taylor had established

14. Obituary, Dent. Reg., 27:291-293, 1873.

15. Obituary, Dent. Reg., 38:1-12, 1884; Thorpe's Biography of Pioneer American Dentists and Successors.

16. Obituary, Dent. Reg., 22:91, 1868.

the same year. Later, Dr. Taylor's eyes threatened to fail and he sold out his store and moved to Crawfordsville, Ind., establishing another store, with Irwin Taylor in charge. The merchandise business not proving satisfactory, it was closed up and Irwin Taylor went to Maysville, Ky., where he studied dentistry with his brother Joseph Taylor, in 1841. Shortly after, he went to Natchez, Miss., at which place his brother Edward was practicing dentistry.

Irwin Taylor died at Natchez, April 4, 1843, and was buried in Spring Grove Cemetery, Cincinnati, Ohio.

James and Joseph Taylor were charter members of the Mississippi Valley Association of Dental Surgeons, Aug. 13, 1844.

James Taylor was among the first students of Dr. John Harris in Bainbridge. In an article on the "Life and Character of Chapin A. Harris,"[17] he states:

> I was a student of medicine in his (Dr. John Harris') office . . . . He had acquired considerable reputation as a general surgeon and was a skillful operator. He was much devoted to the study of anatomy and chemistry, fond of experimenting; had a quick and active mind, was polished in his manner, delighted in imparting instruction to his pupils, devoted much time to their interests and prided much in their advancement in medical knowledge. At that time he had three or four students, *two of whom followed his pursuit of dental knowledge,* myself being one of them.

This statement refers to about 1826-1827. While it furnishes a pleasing estimate of the character and qualifications of Dr. John Harris, it furnishes convincing evidence that the subject of dentistry was receiving the fullest attention. The statement indicates also that some of Dr. Harris' pupils pursued a medical career.

The three elder Taylors contributed extensively to dental literature, particularly Dr. James Taylor, whose contributions embrace practically every topic relating to dental practice.

Dr. James Taylor founded the Ohio College of Dental Surgery in Cincinnati in 1845, the second dental college established. He was the first editor of the *Dental Register of the West* and president of the American Dental Association in 1866.[18]

Jared Taylor (1802-1875), another son of Joseph and Jane Irwin Taylor, was the father of Dr. James Irwin Taylor (Sept. 29, 1842-May 10, 1916), who graduated from the Ohio College of Dental Surgery in 1865 and practiced in Cincinnati until his death. His son, Dr. Henry C. Taylor, now of Toledo, Ohio, graduated at the Ohio College of Dental Surgery in 1894.

Dr. James Silcott, of Cincinnati, a graduate of the Ohio College of Dental Surgery in 1886, is also a grandson of Jared Taylor.

Dr. James Taylor Irwin (Aug. 3, 1833-Feb. 21, 1905), of the Ohio College of Dental Surgery, 1853, for many years a dentist in Cincinnati, was of the Irwin family into which the senior Taylor married, Aug. 8, 1797.

Everything presented in evidence of the fact, as stated in the beginning, that "dentistry, as a science, had its beginning in the village of Bainbridge in the year 1827" is *de visu,* and consideration has been given only to facts that have been substantiated by records the authenticity of which cannot be doubted. The few deductions that have been offered have been made with caution.

Research has disclosed the names of many pioneer itinerant dentists in southern Ohio, not pertinent to this subject,

17. Taylor, James: Dent. Reg. of West, 15: 79-80, 1861.

18. Dent. Reg., 38:1-12, 1884.

but they have been preserved in a supplement to this paper.

I regret that the descendants of John Harris have not thus far been located nor his photograph been procured.

In 1849, Dr. Harris' family were residing in Frederick, Md., during which time he seems to have continued his itinerant trips in the practice of his profession. It was his fate to have his dental career brought to a close in a small village as he had begun it; and though far distant from the loving care of a devoted family, he received tender ministrations from the members of the Masonic Fraternity.

His death occurred at Hertford, N.C., July 26, 1849, and the day following, Perquimans Lodge No. 106, F. & A. M., officiated at his burial. Rev. William Grant of the M. E. Church preached the service and the burial took place in the Hertford Public Cemetery, which is a beautifully kept burial ground. His grave is among many of the other unmarked graves. While standing here, with a feeling of reverence for a man who, in a short span of life, did more for the educational advancement of dentistry than had been accomplished in all the ages that had preceded him, the truism—"The measure of success is not what we get out of life but what we leave after it"—seemed a dominating thought.

While there should be a fitting memorial at a site approximating the place of his burial to express a deserving tribute to his efforts in behalf of his profession, the most enduring monument to his vision and foresight is the result of the

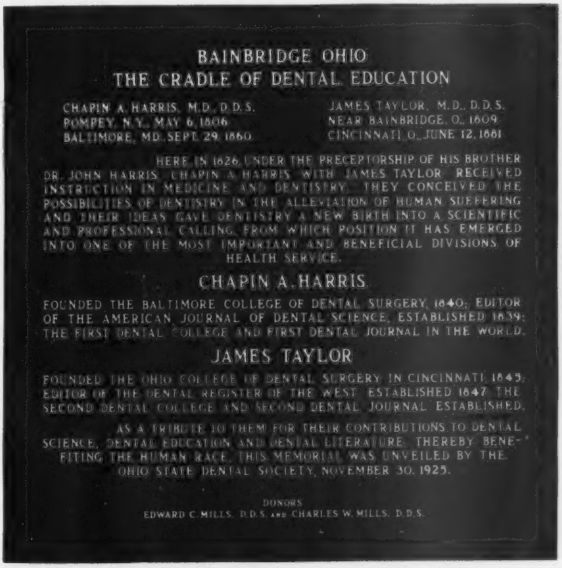

BAINBRIDGE OHIO
THE CRADLE OF DENTAL EDUCATION
CHAPIN A. HARRIS, M.D., D.D.S.
POMPEY, N.Y., MAY 6, 1806
BALTIMORE, MD. SEPT. 29, 1860.
JAMES TAYLOR, M.D., D.D.S.
NEAR BAINBRIDGE, O., 1809
CINCINNATI, O., JUNE 12, 1861
HERE IN 1826 UNDER THE PRECEPTORSHIP OF HIS BROTHER DR. JOHN HARRIS, CHAPIN A. HARRIS WITH JAMES TAYLOR RECEIVED INSTRUCTION IN MEDICINE AND DENTISTRY. THEY CONCEIVED THE POSSIBILITIES OF DENTISTRY IN THE ALLEVIATION OF HUMAN SUFFERING AND THEIR IDEAS GAVE DENTISTRY A NEW BIRTH INTO A SCIENTIFIC AND PROFESSIONAL CALLING, FROM WHICH POSITION IT HAS EMERGED INTO ONE OF THE MOST IMPORTANT AND BENEFICIAL DIVISIONS OF HEALTH SERVICE.
CHAPIN A. HARRIS
FOUNDED THE BALTIMORE COLLEGE OF DENTAL SURGERY, 1840; EDITOR OF THE AMERICAN JOURNAL OF DENTAL SCIENCE, ESTABLISHED 1839; THE FIRST DENTAL COLLEGE AND FIRST DENTAL JOURNAL IN THE WORLD.
JAMES TAYLOR
FOUNDED THE OHIO COLLEGE OF DENTAL SURGERY IN CINCINNATI 1845; EDITOR OF THE DENTAL REGISTER OF THE WEST, ESTABLISHED 1847; THE SECOND DENTAL COLLEGE AND SECOND DENTAL JOURNAL ESTABLISHED.
AS A TRIBUTE TO THEM FOR THEIR CONTRIBUTIONS TO DENTAL SCIENCE, DENTAL EDUCATION AND DENTAL LITERATURE, THEREBY BENEFITING THE HUMAN RACE, THIS MEMORIAL WAS UNVEILED BY THE OHIO STATE DENTAL SOCIETY, NOVEMBER 30, 1925.
DONORS
EDWARD C. MILLS, D.D.S. AND CHARLES W. MILLS, D.D.S.

Fig. 19.—Tablet erected to Chapin A. Harris and James Taylor at Bainbridge, Ohio, "the cradle of dental education." This tablet on the town hall at Bainbridge, was unveiled Nov. 30, 1925 (THE JOURNAL, February, 1926, p. 276; Ohio Archaeol. and Hist. Pub., April, 1926, pp. 380-401.)

inspiration which he imparted in his school of "Medical Instruction."

(During a visit to Hertford during the past summer (1931), it was found, on examination of the records of the Masonic Lodge several years previous to 1849, that Dr. Harris' name does not appear; but it appears as a visitor on April 11 and June 16, 1849. The "Index to the Executors and Administrators," in the office of the county clerk refers to an entry on the Minute Docket, Vol. 9, p. 119, as follows: "August Term 1849. Letters of administration upon the estate of Dr. John Harris were committee to Jos. H. White who entered into bond in the sum of $1,000 with W. H. Bagley and B. J. Saunders (Saunders to sign later) and qualified agreeably to law." No record was found of filing a return.)

CONCLUSION

The high standards for the dental profession that were maturing in the mind of Dr. John Harris during his activities in Bainbridge were brought to full fruition by the students who came under his influence. Not often is it granted to one to view the results of the travail of mind in the projection of an idea, but Dr. John Harris lived to witness through the work of Chapin A. Harris and James Taylor, the passing to future generations of this heritage of untold worth bequeathed by him.

May we then be worthy of this heritage and enter into it with humility and profound thankfulness that to us has been handed this torch of work and research for the benefit of humanity, and may we have the strength and courage to bear it high and to keep the faith.

SUPPLEMENT

SOME PIONEER DENTISTS OF SOUTHERN OHIO NOT MENTIONED IN TEXT

CHILLICOTHE

Scioto Gazette: Dr. C. J. Ward, Nov. 24, 1930; resident dentist, Feb. 18, 1835. Dr. Joseph Sanford, surgeon dentist, March 4, 1842. Dr. I. M. Young, surgeon dentist, of Cincinnati, March 30, 1842.

LANCASTER

Lancaster Gazette: July 17,1827, Dr. Hardyear at Mr. Steinman's Hotel; terms, inserting a tooth, $3; Cleaning, $1; Plugging, $0.50. Oct. 23, 1827, J. Walker, for a short time at Col. Nobles. Feb. 24, 1829, Dr. Isaac A. Gibbs at Mr. Steinman's Hotel. May 3, 1831, Dr. J. L. Ligget of Zanesville, announces occasional visits, and lectures in City Hall on the importance of the teeth. May 24, 1832, Dr. A. Crane tenders his services. June 14, 1832, A. Kilbourn, surgeon dentist (from Columbus); room at D. Rokol's. Feb. 12, 1833, E. Taylor, surgeon dentist, room at D. Rokol's Tavern. Feb. 2, 1837, D. C. McGee, surgeon dentist, room at Phoenix Hotel.

COLUMBUS

Ohio State Journal: Jan. 17, 1829, Isaac A. Gibbs, surgeon dentist, Mr. S. Barr's Boarding House, credentials from New York City. Oct. 29, 1829, George Whalen, surgeon dentist, office at Mr. Browning's Hotel.

Ohio State Journal & Columbus Gazette: Jan. 6, 1832, A. Kilbourn ("grateful for past favors," indicating a previous visit). March 3, 1832, Thomas White, surgeon dentist, announces having studied in Philadelphia; returned Oct. 12, 1833—"One or two young gentlemen will receive instructions on liberal terms." Sept. 22, 1832, Meacham (W. P.) visited Columbus irregularly as late as 1838. Nov. 17, 1832, Meacham & Smith, a firm of short duration. May 11, 1833, Dr. Smith (office by self) continued in Columbus as late as 1838. June 8, 1836, H. Thompson, resident dentist.

Daily Journal & Register: Nov. 2, 1837, Mr. Powell, operative dentist, American Hotel.

Ohio State Journal: Dec. 31, 1838, H. Todd, dentist, announces that he had practiced in New York City the past five years.

KEY TO FIGURE 4

* John Harris' School for "Medical Instruction," Bainbridge, Ohio, 1827.

1. Baltimore College of Dental Surgery, Baltimore, Md., 1840.

2. Ohio College of Dental Surgery, Cincinnati, Ohio, 1845.

4. Philadelphia College of Dental Surgery, 1852.

5. New York College of Dental Surgery, Syracuse, N. Y., 1852.

6. Pennsylvania College of Dental Surgery, Philadelphia, Pa., 1853.

8. Temple University, School of Dentistry, Philadelphia, Pa., 1862.
9. New York University College of Dentistry, New York City, 1866.
10. Washington University School of Dentistry, St. Louis, Mo., 1866.
12. Harvard University Dental School, Boston, Mass., 1867.
13. Tufts College Dental School, Boston, Mass., 1868.
15. University of Toronto, Faculty of Dentistry, Toronto, Canada, 1875.
16. University of Michigan, College of Dental Surgery, Ann Arbor, Mich., 1875.
17. University of Tennessee, College of Dentistry, Memphis, Tenn., 1877.
19. Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, Philadelphia, Pa., 1878.
20. Vanderbilt University, School of Dentistry, Nashville, Tenn., 1879.
21. Indiana University, School of Dentistry, Indianapolis, Ind., 1879.
22. Howard University, College of Dentistry, Washington, D. C., 1881.
23. College of Dentistry, University of California, San Francisco, Calif., 1881.
24. Kansas City-Western Dental College, Kansas City, Mo., 1881.
25. State University of Iowa, College of Dentistry, Iowa City, Iowa, 1881.
26. University of Maryland, School of Dentistry and the Baltimore College of Dental Surgery, Baltimore, Md., 1882.
27. Chicago College Dental Surgery, Dental Department of Loyola University, Chicago, Ill., 1883.
29. University of Minnesota, College of Dentistry, Minneapolis, Minn., 1883.
30. National University, Dental Department, Washington, D. C., 1884.
32. American College of Dental Surgery, Chicago, Ill., 1885.
34. University of Louisville, School of Dentistry, Louisville, Ky., 1886.
35. Meharry Dental College, Dental Department of Meharry Medical College, Nashville, Tenn., 1886.
37. Columbia University, Dental Department, Washington, D. C., 1887.
38. School of Dentistry, University of Denver, Denver, Colo., 1887.
39. Atlanta Southern Dental College, Atlanta, Ga., 1887.
40. Northwestern University Dental School, Chicago, Ill., 1887.
46. Western Dental College, Kansas City, Mo., 1890.
49. University of Illinois, College of Dentistry, Chicago, Ill., 1891.
50. University of Buffalo, School of Dentistry, Buffalo, N. Y., 1892.
52. Dental College, Province of Quebec, Montreal, 1892.
53. School of Dental and Oral Surgery of Columbia University, New York City, 1892.
54. Ohio State University, College of Dentistry, Columbus, Ohio, 1892.
55. Western Reserve University, School of Dentistry, Cleveland, Ohio, 1892.
58. Cincinnati College of Dental Surgery, Cincinnati, Ohio, 1893.
60. School of Dentistry, Medical College of Virginia, Richmond, Va., 1893.
61. Marquette University, School of Dentistry, Milwaukee, Wis., Sept., 1894.
62. St. Louis University, School of Dentistry, St. Louis, Mo., 1894.
64. Omaha Dental College, Dental Department of the University of Omaha, Nebr., Feb., 1895.
69. College of Physicians and Surgeons, College of Dental Surgery, San Francisco, Calif., 1896.
70. University of Pittsburgh, School of Dentistry, Pittsburgh, Pa., 1896.
74. University of Southern California, College of Dentistry, Los Angeles, Calif., 1897.
79. Georgetown University, College of Dentistry, Washington, D. C., 1897.
81. North Pacific College of Oregon, School of Dentistry, Portland, Ore., 1898.
82. Tulane University of Louisiana, College of Medicine, School of Dentistry, New Orleans, La., 1899.
85. University of Nebraska, College of Dentistry, Lincoln, Nebr., June, 1899.
90. McGill University, Dental Department, Montreal, Canada, 1904.
91. University of Montreal, Faculty of Dentistry, Montreal, Canada, 1904.
92. Baylor University, College of Dentistry, Dallas, Texas, February, 1905.
93. Texas Dental College, Houston, Texas, Feb. 11, 1905.
94. Creighton University, College of Dentistry, Omaha, Nebr., 1905.
95. Dalhousie University, Faculty of Dentistry, Halifax, Nova Scotia, 1908.
100. Loyola University, School of Dentistry, New Orleans, La., 1914.

104. University of Alberta, Faculty of Medicine, Edmonton, Canada, 1917.

KEY TO CHART OF COLLEGES (FIG. 4)

The colleges in the United States and Canada, including those discontinued, graduates of which were members of original faculties of later colleges, are listed. The number preceding indicates approximately the order of organization and its position on the chart. The names listed with the colleges are those of the original faculty. The number in brackets indicates, when obtainable, the college of graduation, followed by the year.

Many of the pioneer educators who are not here credited with the D. D. S. degree probably received the degree from the American Society of Dental Surgeons, as a resolution was adopted by that society at its organization meeting, Aug. 18-20, 1840, appointing Dr. Eleazar Parmly as an agent of the society to present a petition to the Legislature of the State of New York asking for a charter with power of conferring the degree of doctor of dental surgery (Am. J. Den. Sc., 1:169, 1839).

In some instances, the faculties are incomplete, and, with a few exceptions, faculty members not known to have practiced dentistry are omitted.

* John Harris' School of "Medical Instruction," Bainbridge, Ohio, 1827.

1. Baltimore College of Dental Surgery, Baltimore, Md., 1840; merged with the University of Maryland, June 15, 1923, under the title of Baltimore College of Dental Surgery, Dental School, University of Maryland. Dean, Chapin A. Harris, M.D., John Harris' school at Bainbridge, Ohio, 1827, (4) 1854, honorary; Horace Hayden, M.D.; Thomas E. Bond, M.D.; H. W. Baxley, M.D.

2. Ohio College of Dental Surgery, Cincinnati, 1845; discontinued, July 1, 1926. Dean, Jesse W. Cook, M.D.; James Taylor, M.D., John Harris' school at Bainbridge, Ohio, (1) 1843, honorary; Melancthon Rogers, M.D.; Jesse P. Judkins, M.D.

4. Philadelphia College of Dental Surgery, Philadelphia, Pa., 1852; discontinued in 1856. Dean, Elisha Townsend (1) 1846, honorary; J. D. White (1) 1856, honorary; T. L. Buckingham (1) 1853; Eli Parry, M.D.; D. P. Whipple.

5. New York College of Dental Surgery, Syracuse, 1852. The buildings were destroyed by fire in 1855, the location was changed to New York City and college named New York State College of Dental Surgery. 1904, it consolidated with the New York Dental School and the name became the New York College of Dental and Oral Surgery. Dean, Amos Westcott (1); Erick Parmly; C. L. Ford (5) honorary; William Dalrymple (5), honorary; L. G. Bartlett.

6. Pennsylvania College of Dental Surgery, Philadelphia, 1853; first organized under the name Philadelphia College of Dental Surgery, and in 1855 changed its name to the Pennsylvania College of Dental Surgery; merged with the University of Pennsylvania in 1909. Dean, Robert Arthur (1) 1841; Elisha Townsend (1) 1846, honorary; T. L. Buckingham (1) 1853; J. F. B. Flagg (4) honorary; Louis Jack (6) 1854; William Calvert; Eli Parry, M.D.

7. The New Orleans College of Dentistry, New Orleans, La., 1861; chartered March 1, 1861, remained in operation two or three years. The breaking out of the Civil War caused an interruption until 1867, when the college resumed, graduating students (1868 to 1877 inclusive). It then became extinct. Dean, John S. Clark (2) 1852; G. J. Fredericks (2); A. F. McLain (6) 1856; W. S. Chandler; James S. Knapp. (This information was received too late, to include on the chart of colleges; otherwise it would appear as from the Ohio College of Dental Surgery.)

8. Temple University, School of Dentistry, Philadelphia, Pa., 1862, organized as the Philadelphia Dental College, for a time named the Philadelphia Dental College and Hospital of Oral Surgery, and later the Philadelphia Dental College and Garretsonian Hospital of Oral Surgery. In 1907, the college was taken over by Temple University and became known as Temple University, School of Dentistry. Dean, J. H. McQuillan (4) 1853; J. Foster Flagg (4) 1856, honorary; G. W. Ellis (6) 1861; William Gorgas (6) 1854; C. A. Kingsbury, M.D.; Thomas Wardell.

9. New York University, College of Dentistry, New York City, 1866; organized as the New York College of Dentistry, June 29, 1925. It became an integral part of New York University and the name was changed to the New York University, College of Dentistry. Dean, N. W. Kingsley (1) 1871; W. H. Dwinelle (1) 1847; J. Smith Dodge, Jr. (1) 1858; Eleazar Parmly; D. H. Goodwillie (6); R. M. Streeter.

10. Washington University School of Den-

tistry, St. Louis, Mo., 1866; organized as the Missouri Dental College. It became the Dental Department of Washington University, and, in 1892, the Dental School of Washington University. In 1918, the name was changed to the Washington University School of Dentistry. Dean, Homer Judd, M.D. (10) 1866, honorary; W. H. Eames (2) 1853; A. M. Leslie (2) 1847; I. Forbes (2) 1850, honorary; W. N. Morrison (2) 1864; H. J. McKellops (2) 1855, honorary; H. E. Peebles (1) 1850, (2) 1850, both honorary.

12. Harvard University Dental School, Boston, Mass., 1867. Dean, Nathan C. Keep, M.D. (1) 1843, honorary; L. D. Shepard (1) 1861; E. C. Leach (6) 1867; I. A. Salmon (6) 1867; George T. Moffatt (12) 1870, honorary; N. W. Hawes (12) 1879, honorary; S. F. Ham (12) 1870.

13. Tufts College Dental School, Boston, Mass., 1868; organized as the Boston Dental College in 1868. In 1899, it became the Dental Department of Tufts College. Dean, J. A. Follett, M.D.; I. J. Wetherbee (1) 1851, honorary; Ambrose Lawrence (6); C. G. Davis (1) 1850; H. F. Bishop (1) 1854; W. H. Atkinson (2) 1859, honorary; W. S. Miller; S. J. McDougall, M.D.

15. University of Toronto, Faculty of Dentistry, Toronto, Canada, 1875. Dean, J. B. Willmott (8) 1871; Luke Tesky (15); R. M. Fisher (15).

16. University of Michigan, College of Dental Surgery, Ann Arbor, 1875. Dean Jonathan Taft (2) 1850; J. A. Watling (2) 1860; W. H. Jackson (16) 1876.

17. University of Tennessee, College of Dentistry, Memphis, 1877; located at Nashville until 1911, united with the University of Memphis, College of Dentistry in 1911 and removed to Memphis the same year. Dean, Robert Russell, M.D., D.D.S.; W. L. Dismukes (2) 1874; John Arrington (7) 1871; H. E. Beach (6) 1870; L. C. Chisholm, registered; J. Y. Crawford (17) 1880, honorary; Gillington Chisholm, registered.

19. Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, Philadelphia, Pa., 1878; organized as the University of Pennsylvania, School of Dentistry in 1878. In 1909, the Pennsylvania College of Dental Surgery and, in 1916, the Dental Department of the Medico-Chirurgical College of Philadelphia were merged into it, and it became known under its present name. Dean, C. J. Essig (8) 1871; E. T. Darby (6) 1855; M. H. Webb (8) 1867; Robert Huey (6) 1867; Louis Jack (6) 1854; S. H. Guilford (6) 1865; H. C. Register (6) 1866; W. R. Millard (6) 1868; J. A. Woodward (6) 1865; R. H. Shoemaker (6) 1864; G. W. Klump; H. C. Longnecker (8) 1876; H. K. Luch (8) 1877; William Diehl (6) 1877; E. C. Kirk (6) 1878; R. J. Nickell (6) 1879; A. H. Scofield.

20. Vanderbilt University, School of Dentistry, Nashville, Tenn., 1879; organized as the Department of Dentistry of Vanderbilt University; discontinued, July 1, 1926. Dean, W. H. Morgan (1) 1848; R. R. Freeman (6) 1869; J. C. Ross (2) 1853; Henry W. Morgan (8) 1876.

21. Indiana University School of Dentistry Indianapolis, 1879; organized as the Indiana Dental College. President, W. L. Heiskell (21) 1883; Dean, P. G. C. Hunt (2) 1870, honorary; J. E. Cravens (2) 1871; Merit Wells (2) 1860; S. T. Kirk; S. M. Goode; W. M. Herriott (2) 1870, honorary; F. Hutchinson; Joseph Richardson (2) 1853; T. S. Hacker (2) 1873.

22. Howard University, College of Dentistry, Washington, D. C., 1881. Dean, J. F. R. Dufour (1) 1867; N. W. Whitcomb, registered; J. B. Hodgin (1) 1869.

23. College of Dentistry, University of California, San Francisco, Calif., 1881. Dean, S. W. Dennis (21), honorary; C. L. Goddard (8) 1874; A. F. McLain (6) 1856.

24. Kansas City-Western Dental College, Kansas City, Mo., 1881. Kansas City Dental College, organized in 1881, united in 1919 with the Western Dental College (organized 1890, Kansas City, Mo.), taking the name Kansas City-Western Dental College. Dean, J. K. Stark (24) 1890; C. L. Hungerford (10) 1880; J. D. Patterson (24) 1883; C. B. Hewitt (24) 1885; R. I. Pearson; W. T. Starr (10) 1889; A. J. Thompson (8) 1872; L. C. Wasson (24), honorary; A. C. Shell, registered; E. N. Laveine, registered; J. R. Boyd, registered; L. P. Meredith; R. W. Brown (8) 1873; W. H. Shulze (24) 1892; H. S. Thompson; W. H. Buckley; W. A. Drone.

25. State University of Iowa, College of Dentistry, Iowa City, Iowa, 1881. Dean Luman C. Ingersol (2) 1883; W. O. Kulp (10) 1867; A. O. Hunt (25) 1883; Israel P. Wilson (10) 1869.

26. University of Maryland, School of Dentistry, and the Baltimore College of Dental Surgery, Baltimore, Md., 1882. The Univer-

sity of Maryland Dental Department was organized in 1882 and, June 15, 1923, the Baltimore College of Dental Surgery united with it under the present name. Dean, F. J. S. Gorgas (1) 1885; James H. Harris (1) 1861; John C. Uhler (1) 1867; Frank L. Harris (1) 1881; Lewis M. Cowardin (1) 1874.

27. Chicago College Dental Surgery, Dental Department of Loyola University, Chicago, Ill., 1883; originally, the Chicago Dental Infirmary. In 1884, the name was changed to Chicago College of Dental Surgery. In 1889, it became the Dental Department of Lake Forest University; and, in 1906, became the Dental Department of the Valparaiso University. Dean, T. W. Brophy (6) 1872; E. S. Talbot (6) 1873; A. W. Harlan (2) 1880; G. H. Cushing (2) 1864; W. W. Allport (2) 1859; L. P. Haskell, registered; Dr. G. V. Black (10) 1877, honorary (lectured in the Chicago Dental Infirmary in 1883.)

29. University of Minnesota, College of Dentistry, Minneapolis, 1883; organized as Minnesota College Hospital Dental Department in 1883, absorbed the St. Paul Medical College, Dental Department in 1888, and became known as the University of Minnesota, College of Dentistry. Dean, F. A. Dunsmoor, M.D.; M. M. Frieselle (2); W. T. Giddings (6); F. H. Brimmer (8) 1877; L. D. Leonard, registered.

30. National University, Dental Department, Washington, D. C., 1884; merged in 1903 with the Columbia University Dental Department, which discontinued in 1921. Dean, H. M. Barker, M.D.; C. A. Von Hartleben (6) 1870; Burrows Nelson (1) 1880.

32. American College of Dental Surgery, Chicago, Ill., 1885. Dean, I. Clendenin, M.D.; Willard E. Hall; I. F. Davenport; G. W. Whitefield (27) 1885; Eugene Vigneron (1) 1883; C. F. Eshbaugh (27) 1886; T. Rix (32) 1886; J. M. Cooper.

34. University of Louisville, School of Dentistry, Louisville, Ky., 1886; organized 1886 as the Hospital College of Medicine, Dental Department, Central University, Richmond, Ky. In 1899, it was reorganized as the Louisville College of Dentistry of Centre College of Danville. In 1918, it became a school of the University of Louisville. Dean, A. Wilkes Smith (6) 1872; C. G. Edwards (1) 1868; J. H. Baldwin (26) 1883; H. B. Tileston (16) 1882.

35. Meharry Dental College, Dental Department of Meharry Medical College, Nashville, Tenn., 1886; formerly, the Central Tennessee College, Meharry Dental Department; later, connected with Walden University. Dean, G. W. Hubbard, M.D.; W. H. Morgan (1) 1848; J. B. Bailey (20) 1881; A. P. Johnson.

37. Columbia University Dental Department, Washington, D. C., 1887; name changed to George Washington University Dental Department in 1903, when it united with the National University Dental Department, Washington, D. C.; discontinued in 1921. J. Hall Lewis (1) 1879; H. C. Thompson (8) 1871; M. F. Finley (16) 1878; H. B. Noble, Sr. (1) 1857; D. W. McFarland (6) 1855; R. B. Donaldson (1) 1878; J. C. Smithe (1) 1878; L. C. F. Hugo (1) 1887; W. S. Harban (1) 1877; H. B. Noble, Jr.

38. School of Dentistry, University of Denver, Denver, Colo., 1887; organized as the Denver College of Dentistry, united in 1901 with the Colorado College of Dental Surgery, forming the Dental Department of the University of Denver now named as above. Dean, A. B. Robbins, M.D.; P. T. Smith (6) 1868; J. M. Norman, registered; M. A. Bartleson, registered.

39. Atlanta Southern Dental College, Atlanta, Ga., 1887; organized as the Southern Dental College, name changed to the Dental Department of the Atlanta College of Physicians and Surgeons in 1887, and united with the Atlanta Dental College 1917 to form the present college. Dean, L. D. Carpenter (39), honorary; William Crenshaw (1) 1874; John S. Thompson (6) 1873; R. A. Holliday (6) 1875; Sidney Holland (7) 1870.

40. Northwestern University Dental School, Chicago, Ill., 1887; absorbed the American College of Dental Surgery in 1896 and the Northwestern College of Dental Surgery in 1898. Dean, E. D. Swain (2) 1883, honorary; G. V. Black (10) 1877, honorary; Thomas L. Gilmer (10) 1881; G. H. Cushing (2) 1864; J. S. Marshall, registered; C. P. Pruyn (27) 1885; I. A. Freeman (40) 1890; A. B. Freeman (8) 1886; B. S. Palmer (16) 1883; W. B. Ames (2) 1880; A. E. Matteson (40) 1890, honorary; E. L. Clifford (6) 1879; G. W. Haskins (27) 1887; G. W. Whitefield (27) 1885; D. M. Cattell (16) 1879; H. P. Smith (27); secretary of faculty, Edmund Noyes.

46. Western Dental College, Kansas City, Mo., 1890; in 1919, united with the Kansas City Dental College (24). Dean, D. J. McMillan (10) 1877; H. S. Lowry (6) 1880;

A. J. McDonald (10) 1886; J. M. Gross (24) 1887; J. W. Hecker (24) 1887; S. C. Wheat (24) 1889; George Ashton (16) 1882; E. D. Carr (12) 1874; E. E. Shattuck (2) 1876; W. G. Price (2) 1881; C. E. Esterley (2); J. S. Letord; H. S. Thompson; S. B. Prevost; Elliott Smith; J. W. Aiken.

49. University of Illinois, College of Dentistry, Chicago, Ill., 1891; organized as the Columbian Dental College; in 1898, reorganized as the Illinois School of Dentistry; and, in 1901, merged into the University of Illinois. Dean, J. S. Marsh, registered; W. H. Pontius (32) 1890; S. M. Wilkie (40) 1890; A. J. Rust (16) 1890.

50. University of Buffalo, School of Dentistry, Buffalo, N. Y., 1892. Dean, W. C. Barrett (6) 1880; J. Edward Line (6) 1871; G. B. Snow (6) 1859; George J. Frey (6) 1891; H. A. Birdsall (8) 1884; C. A. Allen (19) 1881; V. H. Jackson (16) 1877; H. B. Meade (27) 1892; A. P. Southwick; F. E. Howard; G. W. Melotte, registered.

52. Dental College of the Province of Quebec, Montreal, Canada, 1892; affiliated with the University of Bishops College, Faculty of Dentistry, 1892; discontinued, 1904. Dean, G. W. Beers (52); Frederick A. Stevenson (12) 1889; L. J. B. Leblanc (52); S. J. Andres (52); S. Globensky (52); R. H. Berwick (52); J. H. Bourdon (52).

53. School of Dental and Oral Surgery of Columbia University, New York City, 1892; organized as New York Dental School; changed name in 1904 to College of Dental and Oral Surgery of New York; on July 1, 1923, merged with the School of Dentistry of Columbia University, the two forming the present school. Z. T. Sailer (9) 1880; J. Howard Reed (9) 1880; S. B. Price (9) 1880; V. F. Parker (9) 1885; G. H. Winkler (1) 1869; G. L. Curtis (19) 1880; J. A. McKee (19) 1890; S. B. Palmer.

54. Ohio State University, College of Dentistry, Columbus, Ohio, 1892; organized as the Ohio Medical University, College of Dentistry; name changed in 1907 to Starling Ohio Medical College, Department of Dentistry, and in 1914 to the present name. Dean, A. F. Emminger (2) 1876, honorary; A. O. Ross (2) 1882; J. E. Barricklow (2) 1882; James Silcott (2) 1886; G. A. Billow (2) 1892; C. A. Eckert (16) 1882; E. C. Mills (16) 1889.

55. Western Reserve University, School of Dentistry, Cleveland, Ohio, 1892; organized as Dental Department Western Reserve University. Dean, H. L. Ambler (2) 1868; D. R. Jennings (2) 1868; J. R. Owens (8) 1875; G. H. Wilson (16) 1878; H. F. Harvey (16) 1879; W. H. Whitslar (16) 1885; J. W. VanDoorn (9) 1890.

58. Cincinnati College of Dental Surgery, Cincinnati, Ohio, 1893; discontinued, June 1929. Dean, G. S. Junkerman (2) 1881; W. T. McLean (2) 1889; W. O. Hulick (2) 1889; A. I. F. Buxbaum (8) 1887.

60. School of Dentistry, Medical College of Virginia, Richmond, 1893; organized as University College of Medicine, Dental Department, and, in 1913, merged with the Dental Department, Medical College of Virginia (organized 1897) and named as at present. Dean, Lewis M. Cowardin (1) 1874; C. L. Steele (1) 1881; A. R. Bowles (26) 1891; A. L. Stratford (26) 1884; Leo Pusey (1), 1892.

61. Marquette University, School of Dentistry, Milwaukee, Wis., September, 1894; in 1907, became part of Marquette University. Dean, B. G. Maercklein (6) 1886; R. E. Maercklein (6) 1886; Robert Maercklein (6) 1884; A. J. Cohn (6) 1890; H. B. Wiborg (27) 1892; V. A. Gudex (27) 1888.

62. St. Louis University School of Dentistry, St. Louis, Mo., 1894; organized as the Marion Sims College of Medicine Dental Department; name changed to Marion Sims Dental College in 1900; in 1905, changed to St. Louis Dental College, later to Dental Department, St. Louis University, then to St. Louis University Dental School and lastly, to St. Louis University School of Dentistry. Dean, L. A. Young (25) 1889; C. C. Cowdery (10) 1892; A. S. Halstead (10) 1886; P. F. Hellmuth (10) 1889; J. H. Kennerly (10) 1888.

64. Omaha Dental College, Dental Department of the University of Omaha, Omaha, Nebr., February, 1895; discontinued in 1905. Dean, A. W. Nason (64) 1896; W. H. Sherradin (6) 1883; L. P. Davis (24) 1894; J. J. McMullen (16) 1893; W. N. Dorward (2) 1884; H. W. Shriver (25) 1887; H. T. King (64) 1897; O. K. Kelly; L. G. Van Slyke.

69. College of Physicians and Surgeons, College of Dentistry, San Francisco, Calif., 1896. President, Thomas Morffew (23) 1882; Charles Boxton (23) 1883; F. C. Pague (6) 1889.

70. University of Pittsburgh, School of Den-

tistry, Pittsburgh, Pa., 1896; organized as the Pittsburgh Dental College, Department of the Western University of Pennsylvania; in 1909, name was changed to the present one. Dean, J. G. Templeton (6) 1870; H. W. Arthur (1) 1867; G. L. Simpson (6) 1881; W. H. Fundenberg (8) 1878.

74. University of Southern California, College of Dentistry, Los Angeles, 1897. Dean, Edgar Palmer (32) 1892; J. C. McCoy (10) 1875; F. M. Parker (20) 1888; Ernest Allin (27) 1892; R. H. Shoemaker (6) 1864; A. P. Hays (6) 1888; W. A. Smith (6) 1885; H. D. Requa (6) 1890; A. H. Palmer (6) 1881; R. G. Skillen (6) 1897; C. E. Rhone (6) 1889; P. Hendricks (33) 1891; F. R. Cunningham (2) 1894; W. C. Smith (50) 1893; J. I. Morris (23) 1897; W. H. Spinks (39) 1892; W. R. Haliday (8) 1888; L. E. Ford (27) 1892; H. G. Atwater (27) 1892; G. H. Cushing (2) 1864; E. G. Howard (27) 1890; M. Evangeline Jordon (23) 1898; A. C. Thompson; D. Cave; S. H. Tolhurst; D. R. Wilder.

79. Georgetown University, College of Dentistry, Washington, D. C., 1897; organized as Washington Dental College and Hospital of Oral Surgery, merged, in 1901, into the Georgetown University. Dean, W. N. Cogan (37) 1893; W. W. Evans (1) 1863; A. W. Sweeney (1) 1876; S. G. Davis (30) 1892; F. H. Shultz, registered. Clinical staff: E. Parmly Brown (1) 1879; T. M. Hunter (1) 1880; W. St. G. Elliott (8) 1870; V. H. Jackson (16) 1877; J. B. TenEyck (1) 1873; F. W. Schloendorn (26) 1889; P. W. Evans (79) 1899; S. L. Close (2); M. M. Dolmage, registered; W. D. Narramore.

81. North Pacific College of Oregon, School of Dentistry, Portland, 1898; organized as the Oregon School of Dentistry, 1898. In 1900, the Tacoma College of Dentistry (organized in 1893), Tacoma, Wash., united with it and the name was changed to North Pacific College of Dentistry and finally to the present name. Dean, H. C. Miller (10) 1885; E. M. Hurd (10) 1892; C. R. Templeman (8) 1881; E. G. Clark (8) 1880; E. L. Lane (8) 1892; J. R. Cardwell, registered; John Welch, registered.

82. Tulane University of Louisiana, College of Medicine, School of Dentistry, New Orleans, La., 1899; organized, May, 1899, as the New Orleans College of Dentistry. In October, 1909, it became the Dental Department of Tulane University, with the present title. Dean, J. J. Sarrazin (1) 1887; Charles Eckhart (1) 1879; W. E. Walker (1) 1889; L. D. Archinard (1) 1891; C. V. Vignes (33) 1892.

85. University of Nebraska, College of Dentistry, Lincoln, June, 1899; organized as Lincoln Dental College of Cotner University; it affiliated in 1903 with the University of Nebraska and the merged institutions became known as the Lincoln Dental College. In 1918, the latter was taken over by the University of Nebraska and took the present title. Dean, W. Clyde Davis (25) 1891; H. F. Helms (40) 1898; H. A. Shannon (27) 1898; Oliver Johnson (25) 1899; C. R. Tefft, registered; J. R. Shannon (46) 1897; Harry M. Dunn.

90. McGill University Dental Department, Montreal, Canada, 1904; Peter Brown; F. G. Henry (52) 1899; D. J. Berwick (52) 1897; E. R. Barton; J. B. Morrison (52) 1900; A. D. Angus (52) 1901; W. D. Smith (52) 1901.

91. University of Montreal, Faculty of Dentistry, Montreal, Canada, 1904; organized as the School of Dentistry of Laval University; changed to the present name in 1919. Dean, Eudora Dubeau (52) 1895; J. G. A. Gendreau (52) 1886; Joseph Nolin (9) 1885.

92. Baylor University College of Dentistry, Dallas, Texas, February, 1905; organized as The State Dental College, and taken over by Baylor University in 1918. Dean, D. E. Morrow (62) 1899; T. G. Bradford (62) 1904; H. T. King.

93. Texas Dental College, Houston, Feb. 11, 1905. Dean, O. F. Gambati (20) 1884; T. P. Williams (1) 1884; M. J. Lossing (4) 1894; C. H. Edge (93) 1907.

94. Creighton University, College of Dentistry, Omaha, Nebr., 1905; organized as the Creighton University Dental College. Dean, C. O. Metzler (46) 1897; F. J. Despecher (6) 1887; W. L. Shearer (64) 1902; A. H. Hipple (15) 1889; G. W. Hamilton (40) 1900; P. T. Barber (27) 1890; J. C. Soukup (64) 1902; J. J. Foster (54) 1897; J. J. Peterson (64) 1898; W. M. Condon, registered; L. J. Schneider.

95. Dalhousie University, Faculty of Dentistry, Halifax, Nova Scotia, 1908; organized as the Maritime Dental College, and made a faculty of the University in 1912. Dean, Frank Woodbury (6) 1878; G. K. Thomson (8) 1892; F. W. Ryan (16) 1885; A. G. Cogswell (6) 1888; F. W. Stevens (6) 1890; S. G. Ritchie (13) 1900; H. Woodbury (8) 1877;

G. H. Fluck (8) 1884; W. H. Beckwith (6) 1901; W. C. Oxner (1) 1902; R. E. McDonald (8) 1904; H. P. Temple (8) 1907; W. W. Woodbury (8) 1908.

100. Loyola University, School of Dentistry, New Orleans, La., 1914. C. V. Vignes (34) 1892; J. J. Sarrazin (1) 1887; S. S. Grosjean (1) 1900.

104. University of Alberta, Faculty of Medicine, Edmonton, Canada. Dentistry was authorized as a subfaculty in 1917. L. L. Fuller (8) 1901; H. C. Bulyea (12).

THE ECONOMICS OF DENTAL PRACTICE*

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MUCH has been said and written in recent years about the economics of dental practice, usually with the idea of increasing the income of the dentist at the expense of the patient. At least, little has been said about increasing the quality of dental services in order that the patient might at the same time get more for his money. By that curious inconsistency so characteristic of human nature, the cart, as usual, has been placed before the horse, and apparently it is forgotten that the first step in the economic program is to make certain that the service is worthy the increased fee. If it is not, no amount of high pressure salesmanship can create for long a lucrative practice. On the other hand, if the effort is successfully made to increase the worth of the service rendered, the increased fee will automatically take care of itself. The law of supply and demand will operate here as elsewhere.

Like everything else in life, the problem of dental economics becomes a problem of give and take, one in which the first concern of the dentist should be not "How much can I get?" but "How much can I give?" He should, therefore, begin by studying what he has to give in return for the larger fee which he hopes to get; in a word, by taking an inventory of himself to ascertain his qualifications for rendering the service for which he desires a larger remuneration. With this in mind, it may not be inappropriate to look at the problem first from the standpoint of better service and afterwards from the standpoint of better fees, which is the only logical approach to the subject. Let us therefore, in the study of dental economics, consider briefly the dentist himself, his professional qualifications, his office, his practice, his patients, his fees and finally his rewards.

FIRST, THE DENTIST HIMSELF

To consider first the dentist himself is the logical approach to our problem, for success or failure to realize one's goal of economic independence through the practice of dentistry will depend in no small measure on the dentist himself, his personality, his appearance, his attitude toward his work, his ability to inspire confidence in his patients, his tactfulness, etc.

Personality represents those attributes taken collectively that make up the character and nature of the individual. In a word, personality is what one is. And

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what one is depends largely on one's ideals, which are to a considerable extent under the control of the individual himself. An attractive or unattractive personality is within the making of every one. Personality is of first importance in every walk of life. It should be studied with a view to making it an asset instead of a liability. It may be either.

The appearance of the dentist is also a highly important factor in his success or failure. Cleanliness in mind and body, neatness in dress, attention to every detail of one's personal appearance are essential to the highest success. Slovenly habits, uncared for nails, unclean teeth, clothing and breath saturated with the odor of tobacco, are all handicaps. The dentist himself may be unconscious of these, but the discriminating patient will not be.

The ability to inspire confidence in one's patients is a most valuable asset. The ability to do this naturally varies with different individuals. Personality and frankness plus an attractive office environment are all important elements in creating it. It is begotten of a knowledge of one's work that creates in the mind of the patient the impression that one knows what he is about and can be trusted to do it. This cannot be done by bluffing; the intelligent patient instinctively recognizes the bluffer. When to these qualities are added tact, thoughtfulness and reasonable skill, the dentist may be sure he has taken the first step toward an economically successful practice. All are qualities that may be acquired by any one, though, like many other worth while things in life, their acquisition may not be easy. Roosevelt once said: "I am only an average man, but, by George, I work harder at it than the average man." That is the secret of success.

SECOND, THE DENTIST'S PROFESSIONAL QUALIFICATIONS

By the dentist's professional qualifications, his professional education in the dental school is not meant, for every dentist has had this, but his postgraduate education, such as comes to one only through experience, study, attention to the details of daily practice, attendance at meetings, and so on; in other words, his effort to keep himself thoroughly informed in the science and practice of his profession.

The dentist, it should be remembered, is engaged in the prevention and treatment of diseases which affect certain parts of the human body, and the value of his services will depend in large measure on the skill with which he can do this. In order to prevent or treat successfully any disease, it is necessary to know as much about it as is possible: its causes, pathology, diagnosis, treatment, relation to the body as a whole and how, in turn, it may be influenced by bodily conditions.

The practice of dentistry is not just a matter of repairing and replacing lost teeth. The dentist may do all these things with consummate skill and still fail to a considerable extent in his service to his patients; and he will do so because the practice of dentistry is more than the sum total of these things. It is primarily a vocation having and needing a scientific background, without which practice is bound to be empiric, uncertain and unsatisfactory. One of the requisites therefore to the successful practice of dentistry is that the practitioner who aspires to a large and lucrative practice (a legitimate aspiration) should be a student of his profession. Technical excellence in the art of dentistry is not enough. One cannot close his books on graduation day and hope to achieve a

full measure of success in practice, no matter how well equipped his office or how pleasing his personality. He must have the mind of the student. He must be willing to spend long and, if need be, laborious hours in his library, if he is to keep himself informed on many of the intricate problems of daily practice. Playing bridge or golf may be pleasanter, but the economic problems of dental practice are not solved around the bridge table or on the golf links.

One should begin by subscribing to half a dozen professional journals and making it a part of his daily task to study these. He should include in this number at least one good medical journal, such as the *Journal of the American Medical Association,* in order to keep in touch with general medicine and its relation to the more specialized practice of dentistry. He should also create a library by purchasing a few good books each year and adding to these the bound volumes of his journals. He will need at least one good medical dictionary and two or three dental dictionaries. Let him make it his business to spend a few hours of each week in study. There is nothing that will yield him greater satisfaction or pay him larger dividends.

This program should be supplemented by attendance at as many meetings in the year as is possible. No dentist can hope to keep abreast of his profession who is not a life long student and a regular attendant at its meetings.

If I were asked to name the chief obstacle to success in dental practice, I would say unhesitatingly, lack of study. The dentist, as a rule, is not a student. If you doubt this, ask any publisher of dental books: he will tell you that "dentists do not read." The dentist who does not study may delude himself, but he cannot fool his patients; a desirable practice is not built up in that way.

Nor should the dentist limit himself to professional subjects. He must study the literature of his profession in order to fit himself for his daily work, but he should not stop here. Let him read as widely as he can on all cultural subjects, history, biography, poetry, etc. If he expects to attract to himself a large and successful practice, he can do so only as he qualifies himself to meet on their own ground patients who make up such a practice. An ignoramous can hardly expect to attract to himself a cultured and refined clientele, no matter how skilfully he may do his work.

THIRD, THE DENTIST'S OFFICE

The dentist's office is the place in which he will spend much of his life and where he expects to build his practice. It will be considered only as it contributes to his economic success. In the first place, it must be harmonious and attractive in appearance. It should not be ostentatious and it need not be expensive in its furnishings. It should be equipped with everything that will aid in the efficient conduct of a practice; up-to-date chairs, cabinets, lamps, instruments, pulp testers, x-ray outfit, etc.

Sufficient secretarial assistance should be provided as early in one's practice as is possible in order to relieve oneself of all detail in this feature of the office management, though it should always have the oversight of the dentist himself. Such chair assistance as will relieve the operator of all unnecessary detail should also be provided. It is never economy to do anything in one's office that can be delegated to an assistant who can do it as well or possibly better. A system should be worked out by which every detail of office management is conducted with the

maximum of efficiency, having as its first purpose the conservation of the dentist's time.

Above all else, the office throughout must be scrupulously clean. There is no place for an unclean and untidy dental office. I know of nothing that will contribute more to one's professional undoing than an untidy and unattractive office. In the first instance, it should be made pleasing and attractive and then some one of the office staff should be charged with the responsibility of keeping it so. The dentist himself can hardly do this, though he should keep a general oversight of it. I have found an excellent consultant in this matter to be one's wife. Bring her into the office occasionally and let her check up on how it strikes the feminine mind; you may be surprised at her criticisms. It is usually wise to take them seriously.

FOURTH, THE DENTIST'S PRACTICE

One may have a well appointed office properly equipped and staffed and may even be reasonably skilful and still fall short of economic success. One of the most common explanations of this is what might be called lost motion; in a word, failure to make the most of one's time. Time is the chief cost element in dentistry. If for any reason—inefficiency, lack of punctuality, lack of system and the like—one's time is wasted, someone has to pay for it. If it is included in the bill, as it sometimes is, the patient is asked to pay for something which he did not get. There can be no doubt whatever that there is much lost motion in the practice of dentistry which is appreciably adding to its cost. The dentist, for example, who takes one hour to do what another can do equally well in half an hour has doubled the cost of that operation to someone. By correcting this through the application of more efficient methods, he can increase his income without increasing his fees. No one should consider the raising of fees until he has carefully and patiently studied his methods of practice with a view to stopping the leak at this point. Many operators, not being crowded in their early days of practice, form the habit of taking more time than is necessary to do a given operation, with the result that the habit becomes confirmed and is carried over into the days of full practice, where it becomes a serious handicap to economic success, cutting down as it does the income of the dentist at the same time that it increases the cost to the patient. It is this that explains much of the complaint about the high cost of dental service, and it explains also the public's failure to avail itself of that service to a larger extent.

There is still another factor in the high cost of dental service, namely, the attempt, too often successful, to sell the patient, through high pressure salesmanship, something which he does not need and might be better off without. When to these factors is added the situation in which the patient pays for services so unskilfully performed that he gets almost nothing in return for his money, we have before us all the elements entering into the agitation for panel dentistry, and if it should ever come into being in this country, it will not be because the competent dentist is being overpaid, but because the public, through commercialism, inefficient methods and unskilful treatment, is too often being asked to pay for a service which it does not get and may not need.

FIFTH, THE DENTIST'S PATIENTS

There are three classes of patients who find their way into the office of the den-

tist: (1) those who cannot pay for any kind of health service or can pay but little, (2) those who can afford to pay but are unwilling to pay adequate fees, and (3) those who are both able and willing to pay any reasonable fee.

Every member of the dental profession must share in the responsibility of doing what he can to help those in the first class. As a result of ignorance and economic disability, their need of dental service is little less than appalling. An organized effort should be made by the members of the dental profession to interest their patients—the public—in providing some kind of public service to meet the needs of this most deserving group.

Those in the second group, if less deserving, are no less a problem. This is a very large group who, through ignorance, have little or no conception of the importance of dental service in the promotion of general health. Theirs is a problem in education, and one which rests squarely upon the shoulders of the dental profession; for who is to instruct them if we as dentists do not? The one lesson above all others that needs to be stressed in any educational campaign is the fact that dental service always costs less than does neglect. That the cost of neglect is often indirect makes it none the less real. When it is realized that the food bill in this country amounts to the enormous figure of $37,530,000,000 a year, representing as it does more than 41 per cent of the entire cost of living, one is struck with the economic importance of physiologic mastication in preparing this food for digestion, assimilation and nutrition. If, as a result of disease and defects of the teeth, one-tenth of the food consumed is unfit for assimilation (probably a conservative estimate), the direct cost to the people of the United States amounts to more than three and three-quarters of a billion dollars a year, more than enough to pay the entire expenses of the Federal government each year. And who can estimate the indirect cost as represented by illness, loss of production, premature death, etc.?

In a report submitted to the International Conference of Social Workers in Paris in 1928, Dr. Homer Folks, of New York, made the statement that the cost of sickness to the people of the United States exceeds fifteen billion dollars annually. He stated further that while this amount was being spent on illness, seventy-six million dollars only was being expended in the prevention of disease. In other words, for every dollar spent on the prevention of disease, there was $49.38 spent on the luxury of being sick. It must therefore be evident to any one that the economic problem involved in the conservation of health is not in the cost of medical and dental treatment, enormous though these may be, but the lack of such treatment.

These are facts which cannot be disputed and which should be emphasized in any campaign designed to educate the public in the economic aspect of dental service; and foremost in this campaign should be stressed the importance of prevention and early treatment. This again will cut the cost of dental service in half; and the dentist who in his community does his part in this educational campaign will not only be rendering a valuable service to the public, but also like him who casts his bread upon the waters, he will find it returned to him in the form of increased patronage by which both he and the public will be benefited.

SIXTH, THE DENTIST'S FEES

There are at least four conditions which should govern one in the matter of fees: (1) the demands made on one's services; (2) the nature of the operation; (3) the time consumed, and (4) the ability of the patient to pay.

1. *The demands made on one's services.* This should be the chief factor in determining what one's fees should be. In the early days of practice when the dentist has no reputation and the demand on his services is limited, he should be willing to give his services for any fee that the patient may be able to pay, even to the point of giving services free, the patient merely paying the overhead. In this way, the young practitioner gains a needed experience, enlarges his circle of professional acquaintances and has the satisfaction of doing his bit for that portion of humanity unable to pay full fees. It is during these early years that much of one's contribution to charity in the form of professional services should be made. Until the demands made on the dentist's services are such as to occupy all of his time, he should strive to increase his income by increasing his practice, rather than by adding to his fees. When the time comes that the demand for his services is in excess of the time that he has to give by working reasonable hours, the dentist should either employ assistants or increase his fees. Both may be desirable, though neither assistants nor fees should be increased beyond the point necessary to take care of the overflow. The attempt should always be made to regulate one's practice to capacity. When above that point, one is justified in increasing his fees; when below capacity, to increase fees may only serve to further decrease both one's practice and one's income. Generally speaking, increased fees should wait on an overflowing practice, not on a desire for a larger income.

2. *The nature of the operation.*—This should also be considered in determining fees; on the basis of its value to the patient; the skill required in performing it; the tax on the operator, etc. What that fee should be will depend also on the demand for one's services.

3. *The time consumed.*—In the performance of all dental operations, this is always an important factor in cost. Generally speaking, it is the chief factor. One should not base his fees on the time element only, nor should he quote fees to the patient on this basis. To do so is always a mistake. If all services were of equal value and all operators were equally skilful and could perform the operation in the same time, there might be some justification for hourly charges, but since this is not so and in the very nature of things cannot be, fees should never be quoted or regulated on an hourly basis.

With new patients at least, it is usually desirable to quote fees before the service is rendered, and note of these should be made a part of the case record. Having made the diagnosis and outlined the necessary treatment, one should take into consideration all the factors entering into the service to be rendered, such as time, skill required, value to patient, overhead, etc., and then quote a sliding fee with a probable minimum and maximum cost. It is generally unwise to quote exact fees as one can never be certain of all the factors entering into the case.

4. *Ability of the patient to pay.*—In professional services, there can be no fixed scale of charges by which every one is required to pay the price asked or go without. This can be done in trade, but not in a profession where service of a high technical order is required, and

where service is placed, as it should be, above personal gain. To charge patients according to their ability to pay does not mean that the rich are taxed to pay the expense of the poor. It means, or should mean, that the rich are asked to pay the fee to which the professional man is entitled, and that he reserves the right to charge his less well-to-do patrons a fee below that which would be justified, in order that he may be of service to them also. This means that while he has a certain standard of fees to which he is clearly entitled, he does not and should not apply it to all cases. He willingly tempers the wind to the shorn lamb. It is this that distinguishes a profession from a business.

SEVENTH, THE DENTIST'S REWARDS

It will have been observed that, all through this paper, it has been urged to a considerable extent that fees should be based upon the demands made on one's time. This has been done in the belief that in this way one can best measure the financial worth of his services. Up to the point where demand exceeds supply, fees should be such as to attract a full practice. Having accomplished this, they should be increased, for the professional worker in any field is entitled to a financial reward commensurate with the value of his services. No one can do his best work if he is worried about finances. He must be in a position to meet his obligations promptly and be able to provide for his family and make adequate provisions for his old age; and there is no dentist anywhere who cannot do this with credit to himself and with the approval of his patients if he will go about it in the right way. Whether the dentist succeeds in doing this will, as we have seen, depend on himself, the knowledge and skill which he employs in his daily practice, the way in which he conducts his office, the efficiency with which he does his work, his patients, his fees, and so on. These are all essential to a financially successful practice, and where these are brought to bear in one's work, the financial rewards will follow as naturally as the tides ebb and flow.

But it should not be forgotten that there are other rewards than these—rewards that cannot be computed in the pages of a ledger or pass as currency in the exchanges of the world. If this were not so, if there were no rewards except those to be found in financial success, the dentist, in many instances, would be but poorly requited for the hard and exacting duties which are his. But there are other rewards, for what is there more satisfying or more worthwhile than the knowledge that one has in a given instance rendered a service that cannot be entirely paid for in cash; or the gratitude and appreciation of one's patients who come to him year after year, without ever mentioning the question of fees, in all professional matters giving to him their entire confidence?

These are some of the intangible spiritual rewards of dental practice which will be paid in large measure to any one who places service above dollars.

IMMEDIATE FULL RESTORATIONS*

By SIDNEY S. JAFFE, D.D.S., Washington, D. C.

BY immediate replacement, I mean construction of dentures before removal of the teeth, and insertion of the dentures immediately after extraction, at the same sitting.

Immediate dentures have many distinct advantages, and there is no valid reason that a patient who must lose all of his teeth should go about deprived of masticatory function and shrinking from his usual business and social contacts. Dentists have taught the fallacious theory that we must await absorption of the alveolar bone before prosthetic restoration can be attempted, until they actually have believed it themselves. Many patients are instructed to wait for weeks or months before returning for the construction of dentures.

The edentulous mandible is virtually in a dislocated condition, for it is habitually in an unnatural, strained position.

My clinical observations justify the assertion that immediate replacement helps to conserve the alveolar process.

When a denture is placed immediately, there will be less postoperative pain following the extraction and the intermittent pressure of the denture will promote condensation of bone, i.e., the alveoli will fill in and aid in the formation of the ridge. The custom of awaiting complete alveolar resorption before taking an impression is an injustice to the patient.

The expression of the face is changed after extraction of the teeth as a result of falling in of the lips and cheeks, and the power of expression is impaired also, by the patient's inability to find a position of rest. The jaws come together and the mandible is forced into protrusion. When the lips and cheeks fall inward, the face becomes old in appearance and the patient's state of mind suffers. Attempts to masticate several times a day upon the mutilated tissues interfere with their healing. In addition, the patient acquires abnormal mandibular movements and habits of mastication which it may be difficult to overcome.

Every dentist knows patients who are forced to go through life edentulous because the habit of "gumming" has become established. They are more comfortable without dentures and, after a time, can tolerate only a limited opening of the mouth. At best, patients who go for a prolonged period without some form of rest for the mandible experience great difficulty in adapting themselves to the wearing of dentures. We all know that if we could extract teeth and, by some act of Providence, replant them in twenty-four hours, the patient would have to learn to use them all over again.

Unless the operator has a definite guide, the dentures rarely will restore the previous form and expression of the face.

The problem of securing a pleasing

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esthetic effect is not a problem at all if an immediate restoration is made. I should like to see a movement started to impress the oral surgeon and the general practitioner with the great importance of making casts of the teeth before extraction and keeping the casts for future reference. When a patient comes in for full dentures, all that he is concerned about is esthetics. His thoughts are focused only in this direction, because he takes it for granted that the dentist will give him an efficient and comfortable denture. If he had any doubt of it, he would not go to that particular dentist. Having no knowledge of the problems that confront the prosthodontist, the patient reasons that any dentist can construct the best of dentures. The one thing that he is not sure of is whether the dentist is capable of restoring fully his original appearance. That is why he describes his lost teeth as even, small and white. Sometimes, he really believes it himself. A cast would at least settle that argument.

We all wish to avoid the "store teeth expression." Then, why should we burn the bridges behind us, destroy the natural landmarks and then guess our way back? Most of the artificial teeth that we see are a travesty on Nature. With an immediate reproduction, our chance of erring is minimized. I hope that I will not be understood to advocate absolute reproduction in cases in which marked inesthetic conditions exist. Such deformities, of course, should be corrected; but even in such cases, the original positions of some teeth will be of great value.

There are so many reasons that a patient should have an immediate replacement that it would be nearly impossible to enumerate them all here. A few are worth mentioning:

1. The patient will suffer less postoperative pain and the healing will progress rapidly and more satisfactorily because the denture, acting as a splint or bandage, will protect the alveoli against trauma and infection.

2. As there is little change in the anatomic form and the change is made so easily, the patient becomes accustomed to the denture in a short time. (The patient is instructed not to remove his dentures during the first twenty-four-hour period.)

3. As the patient has never been seen without teeth by anyone, pride will prevent him from removing them even for a short period. His mind is occupied, and, before long, he feels that things are not so bad after all.

4. As the dentures are placed in the mouth while it is still anesthetized, the patient is not conscious of their presence, and when the anesthesia wears off, he is growing accustomed to them.

5. As immediate dentures afford proper occlusal rest, the patient will maintain the proper intermaxillary relationship. Naturally, he will not suffer muscle fatigue, impaired hearing and other associated distresses, because the muscles of mastication will function as usual, the habitual functional paths being kept intact.

6. The dread of going about toothless and of social and business embarrassment deters many sick patients from losing infected teeth which actually are impairing their health. Immediate restoration circumvents embarrassment and is therefore a health service.

7. As I have mentioned, the alveolar ridge does not absorb so readily, but, on the contrary, it develops into a more favorable base. The slight uniform pressure of the denture gives great comfort to the patient, and while long periods of

sustained pressure would cause resorption of the bony base, intermittent pressure accelerates calcification.

8. All dentists have been confronted occasionally with persistent postoperative bleeding. It is rather difficult to handle some of these edentulous cases as there is not a convenient way of holding a compress for a long enough time, and, at best, it is difficult to control the flow of blood with a compress. What more effective and simple means of controlling hemorrhage can there be than a denture that fits over the bleeding area, acting as a bandage and helping to support the blood clot?

9. The muscle tonus and expression will continue normally, maintaining the facial contour and promoting a favorable mental attitude on the part of the patient. His fear and dread are reduced to the minimum and the dentist will have his full cooperation. The matter of his appearance makes a strong appeal to the patient, and pride will help him to overcome any difficulties that may develop following extraction.

10. Finally, in many cases, there is little difficulty in establishing absolute centric occlusion, and that in itself is half the battle.

It is with these thoughts that I present for your consideration a technic for immediate replacement by which the operator can maintain the exact facial contour, with no change in the lingual or labial outline, and with the position of each tooth as Nature placed it in the mouth, thus insuring the correct enunciation of words; a desirable procedure and result in most cases. There are cases in which a change from the former conditions should be made, especially in the prognathic type, but they will have to be dealt with in another paper.

THE TECHNIC

This technic serves a double purpose. It is applied in every case of immediate denture service and may be used to insure natural placement of artificial teeth when the dentures are made some time after extraction.

It must be kept in mind that the complete technic to be described is for immediate restoration only. I am not advocating it as an ideal technic in constructing full dentures when the patient already is edentulous.

In addition to all of the advantages of immediate dentures that I have mentioned, an important consideration is that such dentures can be constructed with only two visits before the final extraction and insertion. They can be made with only one visit.

Examination and Diagnosis.—Preliminary examination of the mouth is necessary; for one must seek to determine the favorable factors in the case. The prognosis is influenced in a great degree by the thoroughness of the examination and, in many instances, unfavorable conditions can be improved. It is wise to make complete roentgenographic examinations. Information concerning general conditions, such as the mental attitude of the patient, may be elicited by questions during the routine conversation leading up to an examination of the mouth and associated structures. Among other conditions, the throat form, the height of border attachments, the general tone of the muscles, the condition of the saliva, the size of the tongue and any pathologic conditions are noted.

In discussing the prognosis with the patient, it is best not to promise any more satisfactory results than are indicated by his particular mouth conditions.

The Impression.—Any impression material that has given satisfaction can be

used to obtain a good impression. I consider "dentocoll" the ideal material for immediate restoration, for, with this material, impressions of rotated and inclined teeth are no more difficult to make than are impressions of teeth in proper alinement. I will venture to say that, at present, we have no better material for making a true impression. It is simple to manipulate and pleasant to taste, permits of an accurate impression of all of the usual undercuts without distortion and can be removed from the mouth in one piece. It affords retention by simple adaptation and adhesion rather than by overcompression of the tissues and suction. In other words, it gives us a perfect picture of the tissues in totally unstrained relations.

We obtain two impressions of each jaw, being careful to include the peripheries. If but one impression is desired, it can be made in the mouth and the cast can be duplicated very easily, and if care is taken in separating, the same impression can be poured a second time. One set of casts will be our master models, which we will keep as a permanent record of the patient's natural denture. The other casts will be the working models.

At this time, we select the teeth. While the patient is still in the chair, teeth should be selected with due regard to mold and hue. The teeth should harmonize with the natural teeth in mold and shade unless there is some outstanding reason to the contrary. We should consult the mold guides of all the manufacturers. Individual peculiarities should be reproduced and, to bring this about, we may have to resort to grinding one or more teeth. We may find it necessary to stain some of the teeth with fusing stains, and this can be done effectively by investing the pins before placing them in the furnace.

After impressions have been obtained and casts poured, a facebow transfer is taken for the proper orientation of the casts on the articulator.

A centric occlusion record is taken next in wax. As the patient still has his natural teeth, there usually are enough landmarks to indicate the centric relation. If many teeth are missing, bite-blocks should be constructed on trial bases, the bite raised if necessary, and the centric relationship obtained on these blocks.

The two pairs of casts should be placed in the same centric relation and should be interchangeable on any adjustable articulator. I prefer to use an articulator on which the intercondylar width is adjustable, for I believe that the rotation center is an important consideration and that the intercondylar space on the articulator should be as nearly as possible the natural width.

The next step is to obtain the protrusion record in order to set the condylar inclination in accordance with the check-bite readings. We now proceed to mount the upper cast on the upper portion of the articulator.

We replace the upper cast in the upper impression of the facebow fork in exactly the same position it occupied in the mouth. We center the facebow by setting the condylar ends over the projections on the instrument made to receive them, and mount the upper cast on the upper mounting plate of the articulator having the occlusal plane about midway between the bows of the articulator. When the plaster is set, the facebow fork is removed. The wax centric record is placed on the upper cast, and the lower cast is placed in occlusion with the upper exactly as it was in the mouth. The lower cast is attached to the lower mounting plate of the articulator with plaster.

We now adjust the condylar inclinations, using the protrusive bite record previously taken in the mouth. We then release the condyle path clamps, insert the protrusive bite record between the upper and lower casts and manipulate the condyle paths until both casts are firmly seated in the protrusive bite record, exactly as they were when the record was made in the mouth. Plenty of time is taken to make this adjustment, and when we are satisfied that it is correct, we lock the condyle path clamps and make a written record of the inclination on each side for future reference.

Now comes what I believe to be the most important step, placing the artificial teeth in the same relative positions that the natural ones occupied in the mouth. The technic until recently was to cut one tooth at a time from the plaster cast and replace it with an artificial tooth. With this method, the inside of the finished denture presented an uneven surface, and it was hardly possible to predetermine accurately the amount of alveolar process that would be removed during extraction and mouth preparation. Victor H. Sears' use of the transparent base helped materially in overcoming this difficulty, but there still was no method of placing the teeth exactly as they had been and, in case of failure, our bridges were burned and we had to treat the case as we would treat any other edentulous mouth.

My technic serves a double purpose. In the first place, it records the labial and buccal plate outlines and, secondly, it gives a method of locating the original position of the teeth, even if the patient returns some time later for dentures.

This technic includes making a paraffin wax matrix of the palate and of the lingual and occlusal surfaces of the teeth and cutting off all of the teeth of the plaster cast at once, thereby obtaining a smoother alveolar ridge than would result from cutting off one tooth at a time and replacing it immediately. My method enables one to reproduce the lingual outline naturally, as it was before extraction, which insures comfort and adds to the stability of the denture.

This part of the technic is as follows:

A thin sheet of pink paraffin wax is adapted carefully to the palate of the master model and around the lingual surfaces of the teeth, extending over the incisal, lingual and buccal cusps. This palatal counterpart is built up solidly with paraffin wax, which extends about one-eighth inch above the occlusal surface. The wax is chilled and trimmed with a sharp knife around the labial and buccal cusps so that the thickness of wax is about one-eighth inch over the teeth except where the buccal and labial surfaces are exposed.

The crowns of all teeth of the upper case are cut off, about 1 mm. of the neck of each plaster tooth being left. The extending 1 mm. of plaster is smoothed down to make a nice even ridge, care being taken not to change the cast of the soft tissues. It is desired in this technic to retain on the model the entire outline of the labial and buccal tissues, regardless of how the oral surgeon may see fit to trim the tissues after extraction. My aim is to reproduce permanently in the dentures the shape and outline of the tissues as they were before extraction.

After the teeth have been cut off the upper cast, we postdam arbitrarily at the junction of the hard and soft areas by scraping with a suitable instrument a beveled groove at the junction of the vibrating palate, and provide for necessary relief over the hard areas. Next, we place the paraffin wax matrix on the cast and proceed to fit the artificial teeth in the spaces of the matrix. With a definite reg-

istration of the lingual and occlusal surfaces, the fitting becomes rather an easy task.

We remove the matrix and note how the set up teeth fit with the plaster teeth of the lower cast, proceeding with the same technic on the mandibular cast. After satisfying ourselves with the position of the anterior teeth, all that is necessary is to change the posterior teeth slightly in order to obtain the balanced articulation which is absolutely necessary for the proper functioning of any artificial denture. While it is not within the scope of this paper to give a detailed description of how to obtain balanced occlusion, I wish to emphasize its importance.

Unless a dentist chooses to understand occlusion thoroughly, he is bound to set up teeth by rule of thumb. We may define balanced occlusion as "such contacts of the occlusal surfaces of all of the teeth as will maintain stability of the dentures in the various excursions of the mandible." This is, of course, the ideal balance, and we should at least strive for it.

The teeth having been set up, the next step is to reproduce the palate, rugae and lingual necks of the patient's own teeth. My favorite method is to take the master cast and dam off the teeth with plasticin, leaving the palate and about one-eighth inch of the lingual surfaces of the teeth exposed. I then pour low fusing metal on the cast. When this is cooled, I place a piece of a No. 7 soft metal which is about 25 gage on the metal die, swage it with a rubber pad, trim and fit it to the palate, and finish the waxing and carving. On the labial surface, I place the thinnest amount of wax possible.

After the dentures have been vulcanized and finished, we are ready to extract the natural teeth, prepare the mouth surgically and make the immediate replacement.

DISCUSSION

Dayton Dunbar Campbell, Kansas City, Mo.: There should be no adverse discussion of the advantages that a patient may derive from the immediate insertion of a denture following the removal of the teeth. Only those whose fast declining health necessitates hospitalization, where quiet and rest are of greatest importance, and those who are not financially able are prohibited from securing this service of inestimable value. We are accustomed to refer to this type of service as a preliminary denture service, because, in our office, it is constructed before the patient is supplied with the temporary dentures. The advantages both to the patient and to the dentist to be gained by this type of work are numerous. The particular advantage is, as Dr. Jaffe points out, from the point of view of esthetics, for, by this means, we are able immediately to supply the patient with some substitutes for his natural teeth and thereby eliminate the necessity of his being seen without teeth, or having to hide himself from the public eye. Among other advantages to be gained is the preservation of facial outline, which otherwise may be changed and which may with difficulty be restored to normal. The preliminary denture also forms a rest for the mandible and a splint or bandage for protection of the tissues, and prevents food and other foreign substances from entering the sockets. In constructing an upper and lower preliminary denture, it is found to be the best practice to remove the upper teeth and construct the upper preliminary denture at one sitting and then allow the patient to recuperate for two or three days, at which time the lower teeth are removed and a denture constructed to occlude with the upper denture. Our method of constructing this type of denture differs as much from that suggested by the essayist as the two methods of constructing inlays, *i. e.*, the direct and indirect technic, differ. You must choose whether you wish the dentures to serve over a period of weeks or of years. If only a few weeks, as I am constrained to believe is better, then a denture may be constructed immediately after the removal of teeth by the use of sealing wax. This requires from forty-five minutes to an hour, and, since it is intended to serve but a short while, should be very inexpensive. This denture is constructed of a reenforced Alston's or "true base" plate and the teeth attached with Dennison's sealing wax No.

231. Any crowns or bridges that are removed are incorporated in the denture and help admirably in maintaining the familiar appearance of the patient. In view of the patient, one of the adhesive powders is sprinkled quite generously in the intaglio or tissue side of the denture, and it is then inserted. The patient is instructed to wear the dentures throughout the remainder of the day and through the night, but to remove them in the morning and scrub thoroughly in cold water. The patient should also be advised that it will be necessary for him to use the powder quite generously in order to retain the dentures. The reason for being so explicit about instructions in using the powder is purely psychologic, i.e., it is desirable to have the patient return to the office in a few days triumphant over the fact that he did not have to use the powder to retain his dentures, since these dentures are ordinarily very satisfactorily retained without the use of any artificial aid, owing to the fact that they act as a mold or matrix for the blood clot and control the swelling to such a degree that the tissue accurately fits the dentures. The patient is instructed to return to the office in eight or ten days for examination. At this time, the impression is taken for the regular vulcanized denture, or so-called temporary denture, and the case is handled in the customary manner, the patient being permitted to wear the preliminary denture during the time. When the vulcanized denture is completed, transition is made so that the chain of keeping the patient continuously supplied with teeth is not broken. It may be noticed that these preliminary dentures are rather thick, bulky and heavy. This has a decided advantage, for the patient has been comfortable with these and when we remove them and in their place insert a nice thin polished, finished denture, he has the same feeling that one would have if, after wearing hip boots all day, he put on his house slippers. He may feel that he is floating on air for a few steps, and it is our conviction that if the patient may be made to "float on air" for a time with the new denture, something has really been accomplished. The question may be aroused in the patient's mind as to his ability to wear any kind of denture over the injured gum tissue, and he may question us with: "Doctor, won't these hurt my sore gums?" And our answer is "Yes, these dentures will hurt your sore gums in the same degree that a bandage or splint will hurt an amputated finger or arm." The patient may not feel so well with the denture in the mouth, but he will feel much better than with it out, and it is soon found that the patient is the most enthusiastic person regarding this service. This denture may be worn for a period of from ten days to three weeks. When the tissue begins to sustain the pressure of mastication, the teeth begin to come off, and the patient is automatically driven to return for a more permanent denture. To summarize the advantages this denture has: 1. It acts as a rest for the mandible. 2. It holds the lips and cheeks in the proper relation. 3. It gives proper form to the blood clot. 4. It affords protection to the soft tissues within and without the sockets of the extracted teeth. 5. It acts to prevent the development of extraneous movements of the mandible. 6. It maintains the facial outline. 7. It facilitates speech. 8. It prevents the tongue from becoming enlarged. 9. It minimizes disturbances in the region of the glenoid fossa. 10. It is an aid to the general comfort of patient. 11. It acts to reestablish confidence in the patient, leading him away from that depressing thought of losing teeth. 12. It prevents changing of the interval between the jaws. 13. Its use accustoms the patient to the presence of a foreign object in the mouth. 14. It aids the patient in becoming accustomed to the new denture.

Victor H. Sears, New York City: The use of the lingual matrix as developed by Dr. Jaffe is a valuable contribution to immediate denture service. Its virtue lies in assuring to the patient the same general contours in the replacement as existed before the removal of the teeth. It is true that there are some theoretical objections to immediate restoration, but the objections are, after all, merely theoretical and are volunteered mostly by dentists who have applied the technic improperly or not at all. Patients who have had the teeth restored in this manner are loud in their praises; which helps to prove the merit of the procedure, and also helps to build a practice. The only additional aid which might be suggested to make the procedure more exact is the use of the transparent matrix to definitely check up on the ridge after extraction and before insertion of the dentures. This transparent matrix, together with Dr. Jaffe's lingual matrix, makes accurately controlled immediate restorations possible. These aids should be more widely employed by the profession.

Dr. Jaffe: Dr. Sears is absolutely correct in

advocating the use of the celluloid transparent baseplate in addition to my technic, for, in abnormal conditions, such as orthognatic or prognatic cases, it is a positive help and really a necessity. It is also so easy to prepare that I do not see why it should not be incorporated. Dr. Campbell, I have no doubt, is familiar with every phase of immediate denture service, for he has a chapter on it in his book that was published in 1924. Some one in the audience asked me how I justified the use of dentocoll for taking full impressions since it is impossible to secure compression with it. In the first place, I am advocatings its use only when impressions are taken before the extraction of the teeth. I do not remember who said that when a man has the courage to advocate a radical departure from conventional methods, he has much explaining to do. The willingness to scrap not only physical equipment, but also mental equipment is getting to be very common to modern practice. To me, the fact that dentocoll cannot be compressed is the virtue of it. What does plaster do that dentocoll does not in much less time and with greater precision? I am perfectly willing to forego compression for the greater accuracy secured in the other parts of the impression, such as undercuts and tilted teeth, for I can compress and relieve arbitrarily. But let us come back to compression in full dentures. I wish to discourage the construction of unnecessarily tight dentures. Dr. DeVan once said, and I agree with him, that developing to the greatest degree the retentive force of an impression for the main purpose of compelling the base of support to resist an overload will, in the long run, meet with failure. Not only will further atrophy of the base of support result, necessitating continual rebasing, but it will also cause the patient to become a "tight fit" addict. This addiction would only be humorous if mouths stood up under such pressure, but unfortunately osteoclasts are ever ready to operate when pressure goes beyond physiologic tolerance. I do not claim any originality in the use of immediate dentures. I merely developed and applied the lingual matrix and the use of the particular technic just described. The other point that I wish to emphasize is the permanency of these dentures. While I hesitate to use the word permanent, these dentures are nevertheless far from temporary, for, in the first place, as I have already mentioned, the ridges under immediate dentures remain in better shape much longer than with other technics and, in nearly all the cases that I have observed, there is little absorption of the alveolar process. Whether it is because of lack of compression or of absolutely proper positioning of the teeth as Nature had placed them, or because a patient is given no chance to develop abnormal mandibular movements, I am not prepared to say, but the fact is there. In the second place, when it is necessary, I rebase the same dentures, for I know that I can hardly improve on the appearance or balance and the patient is already accustomed to them. But the rebasing is not done in the conventional way, for, if I should place modeling composition or plaster say, in the lower denture and try to rebase in this manner, all that we should get would be a snap impression; but realizing that different areas on the lower mandible have different degrees of compressibility, I rebase in sections, a little at a time, using as little material as possible; recognizing also that we never have resorption in the palatal region.

PROGRESS REPORT ON RESEARCH ON DENTAL MATERIALS (1931)*

By N. O. TAYLOR,† Ph.D., and GEORGE C. PAFFENBARGER,† D.D.S.,
Washington, D. C.

THE program of cooperative research inaugurated in 1928 by the National Bureau of Standards and the Research Commission of the American Dental Association has completed its third full year in operation. A brief report of the progress made has been submitted each year. This report, the third in the series, consists of a résumé of the work of the past year, a statement as to the work definitely projected for the ensuing year and a discussion of the plan now in operation whereby manufacturers of dental materials may guarantee that their products meet the requirements of American Dental Association Specifications for dental materials.

THE RESEARCH PROGRAM

1. *The Year 1930-1931.*—The laboratory work for the past year has included studies of various types of mercury for dental use, inlay golds and wrought gold alloys. Reports of this work are to be presented at the annual meeting of the American Dental Association.

The report on mercury will cover the properties of samples of U.S.P. and dental mercury as purchased in the open market. A specification for dental mercury, based upon this work, is presented later in this paper.

The report on inlay golds will contain the data obtained on the properties of current inlay casting golds. These data, which served as a basis for specifications for three types of casting golds, are to be presented with the results of the laboratory work on cast materials.

The work on wrought alloys is still in progress and only a preliminary report on test methods for these materials is to be presented at this time.

The cooperative inlay group from the profession has made considerable progress, and the results obtained are to be exhibited in a group clinic. The methods used in carrying on this cooperative work and the results obtained will also be discussed at this meeting.

Reports on the work have been presented before twenty-five state dental societies or other dental organizations in fifteen states since the last annual meeting, these organizations bearing the expense incident to the presentations.

Eight reports have been published during the year and three others are in the hands of the publishers.

So many requests for information about the work on dental materials have been received that the following paragraphs from Bureau of Standards Letter Circular 239 are quoted.

*A report to the Research Commission of the American Dental Association.

*Read before the Section on Partial Denture Prosthesis at the Seventy-Third Annual Session of the American Dental Association, Memphis, Tenn., Oct. 21, 1931.

†Research Associate for the American Dental Association at the National Bureau of Standards.

LIST OF PUBLICATIONS GIVING DATA ON DENTAL RESEARCH

CONDUCTED AT THE

NATIONAL BUREAU OF STANDARDS

Numerous requests are received by the National Bureau of Standards for references to its publications on dental research. Most of these publications have appeared in the professional journals and therefore are not available for purchase from either the Bureau or from the Superintendent of Documents. They are, however, available for consultation at the numerous dental libraries. The reports by the Bureau, appearing in its regular series of publications, are usually available from the Superintendent of Documents, Washington, D. C., or may be consulted at the libraries of the principal cities of the United States and of several foreign countries.

The work being in active progress, reports will continue to appear until its completion, at which time it may be found desirable to combine all data in one publication. Until this is done, it will be necessary to use the individual reports. To assist those wishing to consult these the following list has been prepared:

Item	Subject	Publication
1	Dental Amalgam: Methods of Testing, Results of Comparative Tests	Bureau of Standards Technologic Paper No. 157; price, 10 cents. (Reprinted in Dental Cosmos, 62, p. 305-335; March, 1920)
2	Dental Amalgam: Specification	Federal Specification U-A-451, for Alloy, Dental Amalgam. (Reprinted in Journal of Dental Research, 7, p. 186-188; June, 1927)
3	Dental Amalgam: General Discussion Emphasizing Needs for Testing of Materials	Journal of Dental Research, 7, p. 173-188; June, 1927
4	Dental Research: Outline of Program	Journal of the American Dental Association, 11, p. 249-250; March, 1924
5	Wrought Materials: Methods of Testing, Values, Compositions	Journal of the American Dental Association, 12, p. 509-546; May, 1925 (See No. 12 below)
6	Cast Materials: Methods of Testing, Values, Compositions	Dental Cosmos, 68, p. 743-764; August, 1926 (See No. 12 below)
7	Selection of Materials: Casting to Dimensions	Journal of the American Dental Association, 14, p. 189-199; February, 1927
8	Casting Materials: Physical Properties; Methods of Testing	Dental Cosmos, 69, p. 1007-1026; October, 1927 (See No. 12 below)
9	Analysis of Dental Gold Alloys: Methods of Analysis	Bureau of Standards Scientific Paper No. 532; price 10 cents (Superintendent of Documents) Journal of Dental Research 7, p. 373; December, 1927
10	Problems of Dental Research (Program, Etc.)	Proceedings American Association of Dental Schools Fifth Annual Meeting, p. 76-86; March, 1928
11	Dental Gold Alloys: Tentative Specification	Journal of the American Dental Association, 15, p. 627; April, 1928
12	Summary of Results on Gold Alloys and Accessory Materials (to April, 1928)	Bureau of Standards Research Paper No. 32; price 35 cents (Superintendent of Documents)
13	(a) Mechanical Amalgamation; (b) Survey and Tests of Current Amalgam Alloys	Journal of the American Dental Association, 16, p. 583-599; April, 1929

Item	Subject	Publication
14	Some Experiments for the Dental School Laboratory; Types of Testing Equipment	Journal of the American Dental Association, 16, p. 1829-1843; October, 1929
15	Second Survey of Amalgam Alloys; A.D.A. Specifications	Journal of the American Dental Association, 17, p. 112-124; January, 1930
16	Outline of Program of Research with the American Dental Association	Journal of the American Dental Association, 17, p. 775-779; May, 1930
17	Casting Investments: Tentative Specifications	Journal of the American Dental Association, 17, p. 780-781; May, 1930
18	Research Appreciated by the Profession	Proc. Iowa State Dental Society, 16, p. 81-85; June, 1930
19	Problems of Dental Research	Journal of Dental Research, 10, p. 547-560; October, 1930
20	Amalgam Technics	Journal of the American Dental Association, 17, p. 1880-1888; October, 1930
21	Inlay Technics	Journal of the American Dental Association, 17, p. 2058-2081; November, 1930
22	Inlay Casting Investments: Tentative Specification	Journal of the American Dental Association, 17, p. 2266-2286; December, 1930
23	Inlay Casting Wax: Tentative Specification	Journal of the American Dental Association, 18, p. 40-52; January, 1931
24	Impression Compound: Tentative Specification	Journal of the American Dental Association, 18, p. 53-62; January, 1931
25	Standards for Dental Materials	Michigan State Dental Society Bulletin, August, 1931 Iowa Dental Bulletin, August, 1931
26	Is Mercury Poisonous in Dental Amalgam Restorations?	Dental Cosmos, 12, p. 1145-1152; December, 1931
27	Problems in Study of Wrought Gold Alloys for Orthodontia	International Journal of Orthodontia, 11, p. 1033-1042; November, 1931
28	Dental Casting Technic—Theory and Practice	Journal Dental Research, 5, p. 681-701; October, 1931
29	Mercury for Dental Amalgams	Journal of the American Dental Association, 19, p. 54, January, 1932
30	Progress Report (1931)	Journal of the American Dental Association, 19, p. 404; March, 1932
31	Inlay Casting Golds Physical Properties and Specifications	Journal of the American Dental Association, 19, p. 36; January, 1932
32	Preliminary Report on Study of Wrought Gold Alloys	Journal of the American Dental Association, 19, p. 410; March, 1932
33	Cast Gold Inlay Technics	Journal of the American Dental Association, 19, p. 185; February, 1932.

Limited supplies of reprints of several of the papers listed above are available through the American Dental Association Research Fellowship at the Bureau of Standards as follows:

Item 17, 10 cents; Item 13 (a) and (b), 15 cents each; Item 15, 20, 23 and 24, 20 cents each; Item 21 and 22, 25 cents each; Item 26, 28, 29, 30 and 32, 15 cents; Item 31 and 33, 25 cents.

Preliminary announcements of more important findings are often made in the monthly publication: Bureau of Standards Technical News Bulletin, price 25 cents a year.

2. *Status of Research Program.*—The end of the year 1930-1931 finds a study of wrought gold alloys in progress. This study will continue during the next year. New projects will be selected from those outlined in earlier discussions of the research program, and will probably include one or more studies of denture

processes and accessory materials, clasp and one-piece casting golds and dental cements.

CERTIFICATIONS FOR DENTAL MATERIALS

Four specifications for various types of dental materials were developed prior to 1931. These covered amalgam alloys, inlay casting investments, inlay wax and impression compounds. A fifth specification covering three types of inlay casting golds has been prepared in the past few months.

As the previous requirements were drawn up, manufacturers were asked to certify or guarantee that certain products would meet the requirements. Many manufacturers accepted this opportunity and forwarded guarantees of the quality of their materials. Subsequent reviews of the guarantees and the actual qualities found in the products led to the belief that many of the certificates executed for materials by the manufacturers had no basis in fact.

The manufacturers of dental materials were recently asked to again list and guarantee such of their products as would now meet the requirements of the American Dental Association and the names of the materials so certified are listed later in this report.

It is well known that uniform quality in any manufactured product requires careful control of the manufacturing

MATERIALS GUARANTEED BY THE MANUFACTURERS TO COMPLY WITH AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 1 FOR DENTAL AMALGAM ALLOYS*

Alloy	Manufacturer	If Not Tested in Manufacturer's Plant Data Were Obtained by
Argentum	Hammond Dental Mfg. Co.	Burt Scientific Laboratories
Brewster	E. R. S. Brewster	K. W. Ray
Certified	Lee S. Smith & Son	
Colonial	S. H. Reynolds Sons Co.	K. W. Ray
Dee Alloy	Thos. J. Dee Co.	
Diamond Edge	Young-Baker Co.	K. W. Ray
Minimax Alloy Formulas 161 172, 173, 174, 177, 178, 180 and 183	Minimax Co.	
Mission Nos. 5 and 6	San Diego Smelting and Refining Co.	K. W. Ray
Modeloy (Quick Setting)	Crescent Dental Mfg. Co.	
Mynol	Mynol Chemical Co.	W. H. Crawford
Ney-Aloy	J. M. Ney Co.	
Odontographic (Quick Setting)	Odontographic Mfg. Co.	
Pearlol	Wildberg Bros. S. & R. Co.	E. L. Conwell & Co.
S-C	Stratford-Cookson Co.	
Silverloy	Crescent Dental Mfg. Co.	
True Dentalloy	S. S. White Dental Mfg. Co.	
White Beauty	Lang Dental Mfg. Co.	K. W. Ray
White Gold and Platinum	Minimax Co.	
Wilkens	Crescent Dental Mfg. Co.	

processes and adequate checking of the qualities of the final product. Manufacturers were accordingly notified that no certificates or guarantees would be forwarded to the Research Commission unless sufficient data were submitted to show that the products met the requirements. For a particular material the following data were required for certification:

1. Serial or lot number of the material tested.
2. Date of manufacture (year and month).
3. Physical properties obtained by standard test methods. (The information given as to physical properties was to include a brief description of the apparatus used in making each test, the data obtained, the name of the observer and the date. All test conditions were to be so defined as to permit of duplication in other laboratories. In the event that tests were made outside the manufacturer's laboratory, the name and address of the testing laboratory were to be given. As occasional tests outside a manufacturing plant do not guarantee uniform production control, some mention was required of the frequency and amplitude of outside tests.)
4. Data covering every requirement of the specification.
5. Specimens of labels, guarantees and instructions for use furnished with the product.

MATERIALS GUARANTEED BY THE MANUFACTURERS TO COMPLY WITH AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 2 FOR INLAY CASTING INVESTMENTS

Investment	Manufacturer	If Not Tested in Manufacturer's Plant Data Were Obtained by
Coe Inlay	Coe Laboratories	
Coecal Universal	Coe Laboratories	
Kerr No. 3	Detroit Dental Mfg. Co.	
R & R. Grey	Ransom and Randolph Co.	
R. & R. Green	Ransom and Randolph Co.	

MATERIALS GUARANTEED BY THE MANUFACTURERS TO COMPLY WITH AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 3 FOR IMPRESSION COMPOUNDS

Compound	Manufacturer	If Not Tested in Manufacturer's Plant Data Were Obtained by
Brewster	E. R. S. Brewster	K. W. Ray
Dresch	Ransom and Randolph	
Kerr Black	Detroit Dental Mfg. Co.	
Perfection	Detroit Dental Mfg. Co.	

MATERIALS GUARANTEED BY THE MANUFACTURERS TO COMPLY WITH AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 4 FOR INLAY WAX

Wax	Manufacturer	If Not Tested in Manufacturer's Plant Data Were Obtained by
Brewster's Blue	E. R. S. Brewster	K. W. Ray
Maves No. 1	The Heidbrink Co.	K. W. Ray

The certificates and the data secured under the foregoing conditions were reviewed carefully and the following lists of materials represent those products for which satisfactory data were submitted. The certificates were in themselves guarantees that their products would meet the requirements for the various types of materials. The supplementary data were

required for the protection of the dental profession.

The number and variety of products guaranteed to meet the various specifications are an indication of the desires of the manufacturers to cooperate in the movement toward better materials. New laboratory equipment has been installed by manufacturers in many cases to assist in plant control. Other firms have employed competent consultants to test materials and aid in development work.

The results of the greater attention given by manufacturers to the characteristics of their products are further shown by the fact that government purchases of dental materials under existing specifications have been found to be almost universally satisfactory in contrast to the fact that rejections ran as high as from 50 to 60 per cent in preceding years.

This satisfactory operation of specifications in governmental purchases. the increased care and thought given to manufacturing processes and the increase in the number of products the properties of which are known and available are indications of manufacturing progress. This in turn forecasts a more intelligent use of dental materials, with an attendant betterment of technics and improvements in dental restorations by those members of the dental profession in sympathy with and supporting this type of work.

The following tentative specification for dental mercury has been adopted. The data on which it is based are given in a paper "Mercury for Dental Amalgam," by Aaron Isaacs.[1]

1. Isaacs, Aaron: J. A. D. A., 19:54 (Jan.) 1932.

AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 6

TENTATIVE SPECIFICATION FOR DENTAL MERCURY

(Approved Oct. 18, 1931)

I. This specification is to cover the properties of mercury for use in the production of dental amalgams.

II. General Requirements: 1. The mercury shall have a bright mirror-like surface free from film or scum. Under certain conditions of storage, mercury may develop a slight film. Such mercury should readily be separated from this film by filtration through chamois skin or some similar filtration medium, and when filtered, the mercury should remain bright after agitation with air. 2. The mercury shall pour freely and in entirety from a thoroughly clean glass container.

III. Detail Requirement: The mercury shall have a nonvolatile residue of not more than 0.02 per cent when the mercury is evaporated from a porcelain crucible at a temperature below its boiling point and the crucible then ignited at a dull red heat.

IV. Methods of Inspection and Test: The determination of nonvolatile residues shall be made on samples having a weight of from 10 to 15 gm.

V. Packing: 1. The minimum net weight of the contents shall be marked on each package. 2. Mercury shall be packed in clean, clear, glass containers.

VI. Notes: 1. Guarantee. Manufacturers may indicate that their products comply with these requirements by placing a statement on the package guaranteeing the material contained therein to meet the requirements of this specification.

2. Responsibility for Any Guarantee. All statements or guarantees that products meet this specification are made by the manufacturers on their own responsibility. In the event of disagreement between purchaser and manufacturer, the American Dental Association will act in an advisory capacity and will designate testing laboratories having equipment for making necessary tests.

A STUDY OF WROUGHT GOLD ALLOYS: PRELIMINARY REPORT*

By N. O. TAYLOR,† Ph.D., GEORGE C. PAFFENBARGER,† D.D.S., and W. T. SWEENEY,‡ A.B., Washington, D. C.

A STUDY of the properties of a large number of wrought gold alloys now available to the dental profession for use in clasp and orthodontia wires is now in progress at the National Bureau of Standards as a part of the cooperative research program sponsored by the Bureau of Standards and the American Dental Association.

The study of the commercial alloys will not be completed for some months, but several of the preliminary studies of softening and hardening treatments for wrought alloys and of test methods have been completed and are the subject of this brief report.

Before tests were started on the large number of alloys now under examination, it was necessary to decide under what conditions the alloys were to be tested and also what test methods should be applied. To this end, a series of preliminary experiments were outlined to determine: (1) the proper softening treatment for wrought alloys; (2) a very severe hardening treatment for wrought alloys; (3) the diameter of specimens suitable for the determination of physical properties; (4) the gage length best suited for tension and elongation tests; and (5) a type of extensometer suitable for the determination of the elastic limit of the alloys studied.

Samples of three alloys were lent by the J. M. Ney Co., the Spyco Smelting and Refining Co. and the S. S. White Dental Manufacturing Co., for use in these preliminary tests.

TABLE 1.—COMPOSITION OF SAMPLES OF ALLOYS*

Alloy	A	B	C
Gold	63.2	57.6	54.6
Copper	11.3	11.7	12.3
Platinum metals	10.6	26.5	24.5
Silver	14.9	4.3	7.1

*Small amounts of other base metals were present in alloys B and C.

The composition[1] of the alloys in percentage by weight are given in Table 1.

The first study concerned the effect of holding specimens at 700 C. (1292 F.) for different intervals of time before

*A report to the Research Commission of the American Dental Association.

*Cooperative research by the National Bureau of Standards and the American Dental Association.

*Publication approved by the director of the Bureau of Standards of the U. S. Department of Commerce.

*Read before the Section on Orthodontia at the Seventy-Third Annual Session of the American Dental Association, Memphis, Tenn., Oct. 21, 1931.

†Research Associate for the American Dental Association at the National Bureau of Standards.

‡Junior Scientist at the National Bureau of Standards.

1. The alloys are listed in order of the gold content and not in the same order as the names of the firms supplying the materials for test.

quenching. R. L. Coleman[2] had stated that 700 C. (1292 F.) was a satisfactory temperature for removing the effects of thermal or work hardening from wrought alloys.

Specimens of the three alloys tested were placed in a furnace held at 700 C. (1292 F.) and kept there for periods of time ranging from five to thirty minutes and were then quenched in water at room temperature. The ultimate strength and hardness of the samples as received were noted and the effects of the softening treatments observed and compared with these values.

The data obtained are given in Table 2.

A consideration of these data shows that little additional softening is obtained by continuing treatments more than ten minutes. On the other hand, it seems possible that the employment of a treatment time of less than ten minutes might give rise to variations in effects through accidental variations in the treatment time. It was decided to subject the large number of samples now under test to a softening treatment by placing them in a furnace held at 700 C. (1292 F.) for ten minutes and then quenching them in water at room temperature.

TABLE 2.—EFFECTS OF SOFTENING HEAT TREATMENTS*

A. Ultimate Tensile Strength Values (Pounds per Square Inch)

Sample	Diameter Inches	Time in Minutes at 700 C. Before Quenching				
		5	10	20	30	As Received
A	0.04	105,000	104,000	102,000	99,500	119,000
B	0.04	109,000	105,000	102,000	99,500	138,000
C	0.04	122,000	119,000	116,000	115,500	153,000

B. Vickers Hardness Numbers

Sample	Diameter Inches	Time in Minutes at 700 C. Before Quenching				
		5	10	20	30	As Received
A	0.04	212	212	212	212	258
B	0.04	215	219	227	201	281
C	0.04	245	220	215	219	279

*Ultimate strength values were obtained on short samples of wire (3 inches long) and are not directly comparable with data given later on results of tests on long samples. Vickers numbers were determined on the ends of short specimens.

A consideration of hardening treatments described for various wrought alloys indicates that the one used by R. L. Coleman[2] represented about as severe a hardening treatment as any alloy might reasonably be expected to meet in prac-

2. Bureau of Standards Research Paper No. 32.

tice either by accident or by design. This treatment consisted of reheating the quenched alloy to 450 C. (842 F.) and then cooling it slowly and regularly to 250 C. (482 F.) in thirty minutes. This treatment was adopted for further tests, not as the treatment assuring the best properties for all types of alloys or even any one alloy, but as a test which reveals the ability of a material to withstand exceptionally severe treatment. The manufacturers of all samples were asked to outline the treatment best suited to hardening their products, and the results of these treatments will be reported later.

The effects on test results of variations in diameter, a comparison of the data secured on samples of different gage lengths and the usefulness of certain types of extensometers were considered together, and a large series of specimens were tested in one group.

Specimens of all three samples 0.04

TABLE 3.—PHYSICAL PROPERTIES OF WROUGHT ALLOYS*

Alloy	Treatment	Gage Length Inches	Elongation Per Cent	Elastic Limit† Lb. per Sq. In.	Ultimate Tensile Strength Lb. per Sq. In.
Specimens of 0.04-Inch Diameter					
A	Softened	2	15.2	75,500	107,000
	Softened	6	12.6	80,500	107,000
	Hardened	2	3.3	93,000	139,500
	Hardened	6	3.4	94,000	130,000
B	Softened	2	17.8	78,000	114,000
	Softened	6	12.9	91,000	124,000
	Hardened	2	18.3	83,000	125,000
	Hardened	6	13.5	86,000	123,000
C	Softened	2	11.8	86,000	130,500
	Softened	6	8.8	107,000	135,000
	Hardened	2	7.5	152,000	191,500
	Hardened	6	3.0	155,000	192,500
Specimens of 0.02-Inch Diameter					
B	Softened	2	22.0	81,500	134,000
	Softened	6	12.7	90,500	132,000
	Hardened	2	17.1	91,000	144,500
	Hardened	6	11.9	100,500	136,500
C	Softened	2	19.2	103,000	142,000
	Softened	6	15.4	106,500	143,000
	Hardened	2	10.5	161,500	212,000
	Hardened	6	2.0	145,000	190,500

*Averages of three or more tests.

†The elastic limit was, for the purpose of this paper, defined as the load at which the strain produced by an additional unit of load equaled or exceeded 1.25 times that strain first observed for that unit of load.

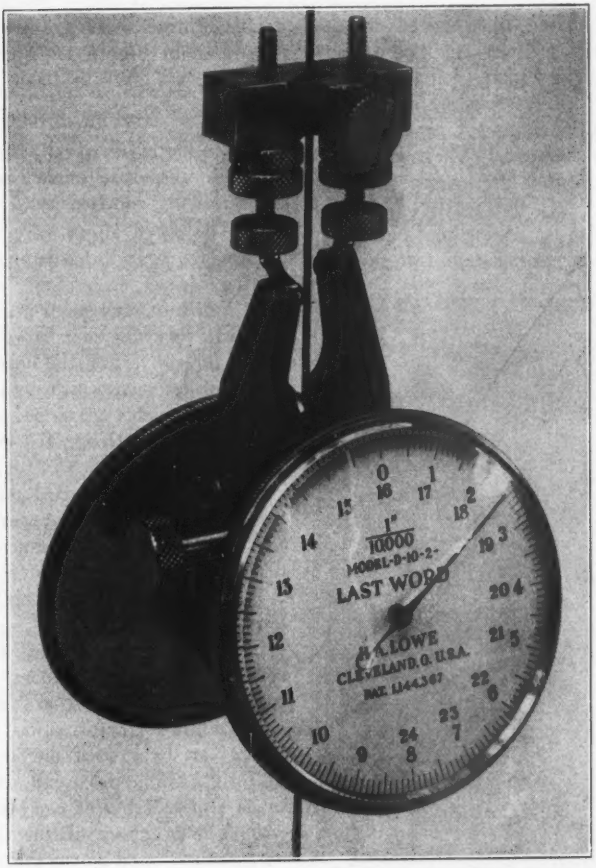

Fig. 1.—Averaging extensometer used in determining stress-strain relationships; gage length, 2 inches; component parts: *A*, D-10 Last Word indicator dials; *B*, grips to hold samples; *C*, clamping screws to hold sample; *D*, upper clamp; *E*, lock nuts to adjust gage length; *F*, set screws to reset extensometer; *G*, notch in body of indicator (*H*) to accommodate the opposite dial; *O*, notch for specimen.

inch in diameter were tested in the softened and hardened conditions, gage lengths of 2 and 6 inches being used with each alloy. Similar tests were made on wires of alloys B and C, which were 0.02 inch in diameter. The 6-inch gage length represented the longest specimen which could be conveniently handled in the small Amsler testing machine (Fig. 2) used for the tension tests. An extensometer having one "last word indicator" graduated in units of 0.001 inch was used on this gage length. A double dial extensometer having two last word indicators graduated in 0.0001 inch was used on the 2-inch gage lengths to secure additional accuracy. This extensometer is illustrated in Figure 1. The results of these tests are given in Table 3.

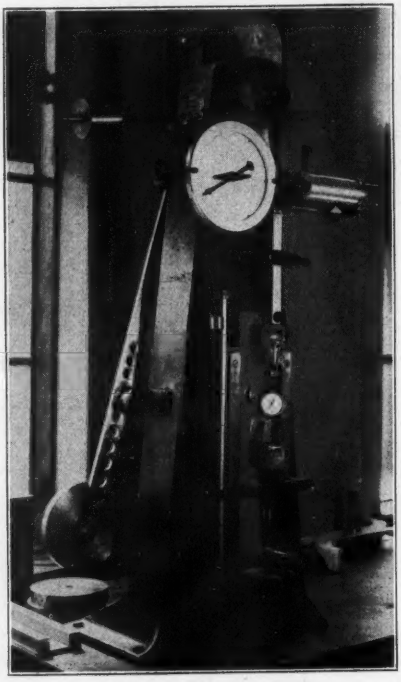

Fig. 2.—Amsler testing machine and averaging extensometer used in testing wrought gold alloys.

CONCLUSIONS

A consideration of all the data obtained in these preliminary tests led to the following conclusions:

1. The three alloys vary in marked degree as regards hardening by slow cooling.

2. Wires of very small diameter were unsatisfactory for test purposes. The factor for converting the observed loads to values per square inch is so large that slight unavoidable errors in applying and reading loads are magnified greatly.

3. A wire 0.04 inch in diameter is of convenient size for testing purposes and this size was adopted for future work.

4. Vickers hardness numbers may be determined on the ends of specimens of 0.04 inch diameter as checks on the tensile data.

5. Short gage lengths (2-inch) offer considerable advantage over the longer specimens. Specimens are usually received with less deformation, heat treatments can be carried out more nearly uniformly and approximately one-half as much alloy is required per test specimen.

6. The accuracy of the double dial extensometer used on the short specimens was such as to afford increased accuracy in the determination of the stress-strain relationships over that obtained with the single dial instrument on the longer samples.

DISCUSSION

H. D. Coy, Hamburg, Iowa: The work of the Research Commission of the American Dental Association and the United States Bureau of Standards, and its cooperating committee of dentists, marks the beginning of a new era in the practice of dentistry. It has been my privilege to be associated with the Bureau of Standards for the past two years as a member of its cooperative com-

mittee investigating inlay casting technics, methods and materials. The guiding spirit of this research has been one of open-minded investigation. Its prevailing motive has been the establishing of the facts as they have been found to exist. Its purpose is to raise the standards and give out the truth in a very practical manner. Readers of dental literature will be impressed by the fact that the majority of the casting procedures described for the enlightenment of the profession have not been based upon scientific facts. In view of our present knowledge, they appear to be very vague and uncertain. Since the first cast gold inlay was made by B. F. Philbrook of Sioux City, Iowa, there have not been such sincere and determined efforts to solve the problems attached to this art as those being made at the present time. When the cooperative group was first organized, I think I may safely say, not one of the 200 members of the cooperating committee could cast to dimension a certain type of casting. This condition alone would seem to establish the necessity for a greater enlightenment on this process so much used by our profession. I think that I may now affirm that, almost without exception, each of the group, after two years of experimental work, is able to cast to any desired dimension. Since the shrinkage of gold, together with its other physical characteristics, has been accurately determined, casting to dimension is reduced to a problem of simple arithmetic. The setting expansion and the thermal expansion of the investment, and, if necessary, combined with them enough wax expansion to compensate for the contraction of the gold, solve the problem. This could be easily done by any of us if a knowledge of the physical characteristics of the materials to be used was available. This has been taken care of by the Bureau in its recommendation that the expansion curve of each brand of inlay wax and inlay investment together with other valuable information be determined by each manufacturer and printed plainly upon each package of his product sold. This requirement has proved the most valuable item of this research, surmounting in value the knowledge acquired by the members of the group. We have nothing but praise for the work of establishing all these scientific facts after these many months of ceaseless effort. This work has all been carried out in an exceptional manner. The opposing individuals and agencies have been brought to a closer understanding, and many trying problems have been solved as they could have been in no other way. There are problems yet to be solved. The only way this can be accomplished is by continuing to give to the Bureau our whole-hearted and unstinted support and cooperation.

DIAGNOSIS OF ORAL CONDITIONS AS RELATED TO THE GENERAL PRACTICE OF DENTISTRY*

By CHALMERS J. LYONS, D.D.S., Ann Arbor, Mich.

ONE of the weakest links in the practice of medicine or dentistry is diagnosis. I like this definition: "Diagnosis is the conclusions arrived at in the process of applying the mind to a collection of scientific data." All too often the practitioners of either medicine or dentistry fail to take into consideration a collection of scientific data, but are content to base their decisions upon one or two outstanding objective signs.

Of course, the large majority of patients that the dentist sees are ambulatory, but in these patients there is a difference in local and general systemic

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conditions that the dentist can easily overlook; which does not always work out for the best interest of either the dentist or the patient.

It must be obvious to all that in the case of many patients who come to the dentist for certain definite relief, only a cursory examination is required in order to determine the operative procedure. It is not toward this type of patient that this discussion will be directed, but to a large group of patients who daily come to the dental office with either a local or a systemic disturbance and who require a careful analysis of all possible factors in their condition, in order that the character of the operative procedure may be determined. In many of these cases, a complete history of the patient is necessary in order that a judicial decision may be rendered. In other words, we must be able to see the individual rather than just the local condition.

Dentistry has accepted the guardianship of the mouth and has assumed the responsibility of keeping it in a condition that will be in harmony with bodily health. Years of scientific research have made it plain that the effect of oral conditions on the systemic condition depends very largely on the degree of resistance of the individual. Much controversy in both the medical and the dental profession relative to the subject of focal infection would have been dissipated long ago had this principle been recognized early.

With this in mind, this discussion will be directed first to the evaluation of the physical resistance of the dental patient. Some of the early writings on the subject of the relation of foci of infection of the mouth to systemic involvement was misleading because the data had been obtained from hospitalized patients, whose physical resistance was naturally below par. The data and statistics were all undoubtedly dependable but could apply only to that particular type of patient. I believe that the sound practice of dentistry today must consist of two types, which for want of better terms may be called radical dentistry and conservative dentistry. For those patients with diathesis, or for those in whom a general morbid condition or old age has lowered the resistance, more radical dentistry is indicated than for the young and vigorous healthy individual.

The time has gone by when the dentist, if he is to meet the responsibilities which the public has every right to expect him to assume, can confine his efforts to taking care of merely local conditions of the mouth, and thus make his treatment routine for all of his patients. Entirely too many dentists today are giving the same medicine, so to speak, and the same size dose to all of their patients. Evaluating the resistance of the patient is sometimes not an easy task, in some cases requiring the cooperation of the internist in order that a judicial diagnosis may be reached. In order to evaluate the resistance of the individual, the dentist should know something about disease and the many conditions that have a tendency to influence disease. Disease may be defined as a deviation from the standard of health in any of the functions or component materials of the body. Whatever is capable of damaging the structures of any organ or tissue of the body or of interfering with its function may be a cause of disease.

Permit me for a few moments to discuss a few of the conditions which cause a deviation from the standard of health. First, let us consider age: There are certain dental operations the success or failure of which are, I believe, largely dependent on the age and degree of re-

sistance. It is a well known clinical fact that the process of repair of the soft tissues as well as of the osseous structures is much more rapid in the young than in the old. As an example, how few of the cases of so-called dry socket following extraction of teeth are encountered in the young and healthy person. In apicoectomy, which I am convinced is a perfectly sane procedure in young persons, age should be a dominant factor in determining indications and contraindications for such procedure.

Again, I believe that the age of the patient should be considered in determining the indications and contraindications for devitalization and the filling of root canals. I am convinced that this procedure is perfectly sound when properly accomplished and one that any good operative dentist may carry out. In the past, one difficulty with this operation has been that the dentist has seen only the root canal and not the patient.

Another factor in the causation of disease that has been overlooked by both the physician and the dentist is the influence of heredity. This is one of the most complex predisposing causes of disease and is therefore proportionately difficult to estimate. Several years ago, Weston A. Price called attention to hereditary influences in certain diseases as factors in determining the policy to be followed relative to the pulpless tooth. How often have we all been disappointed in the extraction of teeth in an attempt to clear up an arthritis, a neuritis or a nephritis, to learn later on that the condition is a physical family trait. Again, if the dentist knows that this particular family is predisposed to some of these diseases, he is not likely to institute dental procedure which might encourage such predisposition. I believe that exception in the case of the vigorous boy or girl, before root canal surgery is attempted, inquiry should be made as to illnesses of the previous generations.

Previous disease of the patient himself should also be made a matter of study. Such disease often predisposes to the same or other affections and no clinical history is complete unless it includes an account of former illness. In measuring resistance, occupation is a factor to be considered. It acts in two ways: first, in exposing the worker to certain deleterious influences; secondly, through the conditions of life in which it is carried on, such as ventilation, exposure to extremes of temperature, excessive use of particular parts of the body, physical or mental exhaustion, deficient exercise, lack of sleep, and irregular feeding. This should all be noted in obtaining the history of the case.

I wonder how many operative dentists have included in their instrumentarium a temperature thermometer. Much valuable information can be obtained in some of our cases by determining whether there is a rise in temperature. Again, the fact that there is a subnormal temperature may be of importance in determining the patient's resistance. In cases of acute dento-alveolar abscess accompanied by very pronounced swelling with no evidence of fluctuation, I believe extraction of the tooth is contraindicated when the temperature is progressively rising. The abnormal temperature is indicative of septic intoxication, and in extraction of the tooth at this time, there is danger that the septic intoxication may develop into a septicemia. At this time in the formation of the abscess, liquefaction has not taken place and the extraction of the tooth will not assure drainage of the abscess. In these cases, as soon as the crisis is reached, the temperature beings to drop and the tooth can then be removed or the abscess

drained without untoward incident. In all cases, when we are attempting to make a complete oral diagnosis, the temperature at the time of examination should become a part of the record.

We now come to the examination of the mouth. To quote from Charles H. Mayo[1]:

> The modern dentist in practice concerns and should concern himself not only with teeth, but also with the jaws and the whole oral cavity. Local lesions in the oral cavity may be the cause, the effect, or the sign of local, systemic, or organic disease anywhere in the body and some organic systemic or local diseases may and do produce various signs in the oral cavity. Consequently, the dentist who looks into a patient's mouth will miss something of vital importance to his patient if he sees only teeth.

Today, the field of dentistry must embrace not only the care of teeth, but also the diagnosis and treatment of many of the lesions occurring in the oral cavity. Entirely too often, the dental examination consists in fixing the attention only on the teeth, and frequently more important facts pertaining to the welfare of the patient are overlooked. I wish that I might impress on the dentist the fact that the time is here when he should be thinking in terms of health rather than in terms of teeth.

Probably one of the most common abnormal conditions of the oral cavity is malformation either of the arch or of the teeth. Do we always stop to inquire as to the reason for these malformations? Are they caused by some hereditary influence or by some habit of the patient? Do we stop to inquire into the possibilities of adenoids and tonsils? Malformations of either the arches or teeth may have a definite bearing on the future happiness and well-being of the patient.

I am thoroughly of the opinion that a complete examination of the condition of the oral mucous membrane should be made in every patient on whom the dentist operates. Many important far-reaching conditions may be overlooked if the dentist is looking only for cavities in the teeth.

Vilray P. Blair, in his excellent book "Surgery of the Mouth and Jaws," makes this very important statement:

> Until the much desired cancer specific is discovered, it is mainly to the educated dentist, grounded in oral pathology, who makes a complete though quick survey of the whole mouth that the medical profession and the public must look to reduce the now increasing death rate from cancer of the mouth.

The dentist should look on any irritation of the tongue or mucous membrane with considerable concern, for it may be a source from which malignancy may easily spring. The dentist usually sees these lesions before the physician, for they do not always cause discomfort to the patient and frequently the patient himself does not know of their presence. By the time the patient seeks the aid of a physician on account of discomfort, they may be so far advanced in their development that the probability of successful treatment is greatly reduced.

When an abnormal area of the mucous membrane of the mouth or tongue cannot be accounted for by dental disorders, the dentist should look on that area with grave suspicion and follow up the case until the condition is identified.

Any swelling about the mouth should be looked on as serious. As an aid in the diagnosis, they should be considered as to (1) the tissues from which they arise; (2) location; (3) history of growth, that is, as to how long the patient has been conscious of it; (4) jaw involved; (5) possibility of trauma; (6) associated conditions of pain; (7) dis-

1. Mayo, C. H.: Interdependence of Medicine and Dentistry, J.A.D.A., 15:2011 (Nov.) 1928.

comfort and deformity, and (8) the presence or absence of cervical lymphadenitis.

If the history and clinical appearance point to the probability of the swelling being either carcinoma or sarcoma, a biopsy is indicated to establish the diagnosis.

In a complete examination of the mouth, all the teeth should be accounted for. Any missing teeth in the mouth not accounted for by a history of a former extraction should be checked up by the roentgenogram. There are many cases of neuralgia, obscure and reflected pain, that are caused directly by unerupted and impacted teeth. When such cases are being investigated, the dentist should not be satisfied by merely obtaining dental films. Many times, these teeth are so far removed from their normal position in either the mandible or maxillae that the dental film will not be sufficient to reveal them. Good lateral or postero-anterior head plates should be made before diagnosis. The records are filled with the many severe nervous disturbances that have been permanently relieved by the dentist's discovering and removing these deeply buried teeth. I should like to emphasize that, in our experience, when the dental film fails to reveal a missing tooth in the jaws, a head plate should be resorted to before the final decision is made.

Just what place should the roentgen-ray findings occupy in oral diagnosis? It should be made a part of the collection of scientific data on which is based a judicial diagnosis; just one link in the chain of evidence of the presence of disease. Entirely too many men are today basing their diagnosis on what they think they see in the dental film.

Some of our best diagnosticians in both medicine and dentistry today before the advent of the roentgen rays were compelled to make their diagnosis by objective signs and subjective symptoms and now use the roentgen-ray findings only to check up their cases. Entirely too many men, when associating mouth infection with systemic disease, are overevaluating the findings on the dental film.

We must constantly keep in mind that we are looking at shadows instead of pathologic processes. The shadows which are produced on the film may be evidence of pathologic change in the osseous structure; they may indicate variations of the anatomic structure, or they may be evidence of traumatic changes; all of which must be considered in evaluation of the film or plate. You are all constantly receiving dental films in the mails asking you to make a diagnosis of the case. Some of the films are so indefinite that even a guess that it was a dental film would be hazardous. A diagnosis in such cases can be of little value. The age of the patient, the physical resistance, the possible recuperative powers must all be coupled with the roentgenographic findings before we make the diagnosis. It has long been conceded that in some of the most vicious infections arising from foci in and about the teeth, the roentgenographic evidence is negative. It has also been demonstrated that some patients may for a long time tolerate certain areas of rarefaction about the apices of teeth without apparently any untoward incident. Again, the condition is largely dependent on the physical resistance of the patient. It is obvious that, regardless of the physical resistance of the patient, such areas should be eradicated, at least as a possible preventive measure. I am merely attempting to show that, as a single means of diagnosis, the dental film falls far short of the value that many men place on it. When an uncertainty relative to the roentgenographic findings

arises, several films from different angles should be made before a definite conclusion is reached. A just criticism of the diagnostic virtue of the dental film frequently made is that an insufficient number of films are obtained in a case. Many men believe that a full mouth examination can be covered by ten films; others, by twelve, and still other men advise the use of fourteen or more. It would seem that a film at proper focus and the proper angle should be taken of every possible area in order to meet all requirements. When the examination falls short of this, it is as a diagnostic factor frequently misleading.

For many years the field of various operations on the maxillary sinus has been a subject of controversy between the dentist and the rhinologist. Unfortunately, perhaps, the anatomic relationship of this air space to structures in the field of rhinology and dentistry has given rise to some misunderstandings relative to its treatment when invaded by disease.

On account of the position of this sinus in the maxillae, many persons come to the dentist for relief when symptoms of disease are present, thinking, perhaps, that the dental condition is the cause. That too much significance has been ascribed to the teeth in the etiology of maxillary sinusitis is now recognized by the larger clinics treating the disease.

In order for us to get a clearer picture of the relative pathologic importance of the maxillary sinus to dentistry and rhinology, let us look briefly into its anatomic relationship to other important structures which have an intimate bearing on its becoming diseased.

The nasal fossae communicate with a number of remarkable cavities, hollowed out within the surrounding bones which are filled with air. These pneumatic spaces include the maxillary, the frontal and the sphenoidal sinuses and the ethmoidal air cells, all paired and within the corresponding bones. The size and extent of these air spaces vary at different periods of life and in different individuals, and one side may vary from the other in the same individual.[2]

In character and function, all of these air spaces are almost identical. Their chief function is to aid in giving resonance to the voice. The mucous membrane lining these spaces is continuous with that covering the lateral wall of the nasal fossa by invagination of the membrane into the air spaces. With the exception that the membrane is thinner, it corresponds in structure with the mucous membrane of the respiratory region, being invested with ciliated columnar epithelium. These accessory sinuses, including the maxillary sinus, are all connected by small natural openings with the meatuses of the nose.

On account of the anatomic relationship of these sinuses, all of them being directly or indirectly connected with each other, infections of the maxillary sinus can hardly be discussed without a consideration of the influence of the other accessory sinuses.

Inflammation of all of the sinuses is not infrequent on account of the constant exposure of the delicate membranes to infections from the air in breathing. This situation seems to be aggravated by climatic conditions. It is a well-known fact that a warm, dry climate is most favorable for amelioration of chronic sinusitis.

Acute and chronic inflammation of all of these sinuses may occur with symptoms present only in the maxillary sinus.

Many of the acute inflammatory conditions have a tendency to become chronic because the openings from the sinuses are small and badly located for free drain-

2. Piersol, G. A.: Human Anatomy, Philadelphia: J. B. Lippincott Company.

age. The acute inflammatory process may cause an edema of the loosely attached membrane and thus the small normal opening become occluded and the secretion is retained.

The function of the ciliated epithelium is to remove the sinus contents, and frequently the inflammatory process will so injure the membrane that retention of the secretions occurs.

Because all of these sinuses are connected through the meatuses, it is a common occurrence for one of these air spaces to be infected from another. Infection from the frontal sinus may pass into the ethmoidal cells or sphenoidal sinus, or infection from any of these cavities may be transmitted to the maxillary sinus through the ostium maxillare. Any one of these cavities may act as a reservoir for another. Pus, following the line of least resistance plus gravity, will seek the lowest levels.

Infection in the teeth and alveolar process may cause infection of the maxillary sinus, and the infection may spread throughout the series of air spaces. The foregoing discussion covers some of the complications which arise in maxillary sinusitis. The dentist will save himself much annoyance, and his patient much discomfort and perhaps future trouble, by recognizing these complications when making a diagnosis. It has been my observation that many dentists and some oral surgeons do not understand the physiology, the anatomy nor the pathologic possibilities of the maxillary sinus sufficiently well to have the same respect for it that they have for the better known pathologic conditions of the mouth.

The question as to just what responsibility the dentist should assume in antral involvement is often asked. Surely, many cases of antral disease are seen in the reg ular routine of a dental practice.

In the successful treatment of maxillary sinusitis, there are three fundamental principles: 1. The source of irritation or infection must be removed. 2. Drainage must be established. 3. Ventilation must be maintained.

In making a diagnosis, it should be remembered that there are two main sources from which infection of the maxillary sinus may arise. The first, and perhaps the least probable, is diseased root ends of teeth and an infected alveolar process. The relationship of the roots of the bicuspids and molars to the antrum is such that septic conditions around these root ends may be a direct source of infection to the sinus.

The second, and by far the most common source of infection, is the nose and accessory sinuses. As I have stated, the mucous membrane lining all of the sinuses is continuous and infection may readily spread from one to another. It is a well-known fact that rhinitis occurring from influenza is a common source of infection of the maxillary sinus. It must be remembered that since pus arising from infection of any of the accessory sinuses may drain into the antrum, pus in that cavity may have been originally formed in one of the other sinuses.

The first step in the examination of a patient suspected of having maxillary sinusitis is to determine whether the sinus *is* infected. Many antrums that are opened either intranasally or intra-orally might better not be operated on. The symptoms of maxillary sinusitis are frequently quite vague and are often confusing. They may take on many forms, such as infra-orbital neuralgia, frontal headaches or a general feeling of malaise without definite localized symptoms.

In efforts at diagnosis, the roentgen rays offer one of our best guides. Sometimes, the dentist attempts to diagnose

antral conditions by dental films alone. These are absolutely worthless for determining the presence of pathologic processes of the antrum. We are dependent entirely on shadows in interpreting roentgen-ray findings. In the case of antral involvement, comparison of one antrum with the opposite one with the same timing and same exposure is essential in making a decision. Again, a survey of the whole field with its environs is necessary for a clear postero-anterior head plate, which is indispensable in making a diagnosis. Of course, dental films will in the majority of cases show a clearer relationship of the root ends of the teeth and alveolar process to the maxillary sinus than will head plates and so should have a place in the roentgen-ray examination. The dental films will not definitely determine whether the teeth are the etiologic factor in the sinusitis. Though the teeth may be pulpless and the patient may have maxillary sinusitis, further studies should be made before the teeth are condemned. The extraction of the teeth *per se* will not clear up the sinus condition. The dental films may show a pathologic process at the root apices and evidence of infection of the alveolar process that will be of value in a differential diagnosis of nasal or oral infection of the sinus. The postero-anterior head plate will reveal whether the maxillary sinus is involved and also the extent, if any, of involvement of the accessory sinuses.

Transillumination is another, but not always reliable, means of making a diagnosis of antral disease. It should be used only in checking up on the other findings. The patient should be placed in a dark room and a mouth light used with the lips tightly closed. If there is an opacity over the lower eyelid, absence of light as observed by the patient when the eye is closed and a darkened area outlining the maxillary sinus on the affected side, empyema of the antrum is suggested. In such cases, the presence of pus and the edematous condition of the affected antrum prevents penetration of light. This method is not wholly reliable for diagnosis, because of variation in thickness of the walls of the antrum in the same person, which would obviously cause variation in the penetration of light.

Ballenger,[3] who recognizes this uncertainty, which is due to anatomic differences, says that the three points to be noted in transillumination are: (1) the red pupillary reflex; (2) the crescent of light corresponding to the position of the lower eyelid, and (3) the sense of the light in the eye when closed. If the red pupillary reflex and the crescent of light are absent, the antrum is probably affected. By noting both sides at once, it may be determined which side, if either, of the maxillary sinuses is affected. In other words, transillumination should be considered a good negative test; that is, if the cheeks appear translucent, it is an indication that the antrums are empty.

In the past, there has been entirely too much controversy as to whether the maxillary sinus is in the field of dental and oral surgery or in the field of rhinology. From an anatomic standpoint, it may rightfully come well within the field of both.

By far the most important factor to consider is whether the antrum is involved; if it is, what is the etiologic factor in the involvement, and whether the case is one involving a greater area than the maxillary sinus.

From my own observations in two large clinics, I am of the opinion that the

3. Brown, G.V.I.: Oral Diseases and Malformations, Philadelphia: Lea & Febiger, Ed. 3, 1918, p. 508.

treatment of maxillary sinusitis should never be undertaken by either the rhinologist or the dentist until there is a very clear and complete knowledge regarding the etiology of the infection.

CONCLUSION

I have called to your attention only a few of the conditions in oral diagnosis that confront the operative dentist. The better diagnosticians we become, the better we are able to serve the patient. I would ask you to keep in mind the definition that I have given for diagnosis, and the fact that it can be safely made only after a careful study of a collection of scientific data.

DISCUSSION

Earl H. Westenhaver, Kansas City, Mo.: It is true, oral diagnosis is one branch of medicine or dentistry that has been very much neglected in the past, but this necessary link in the practice of dentistry has been very much strengthened in the past few years. I agree with Dr. Lyons that we do not collect sufficient scientific data to be able to arrive at an intelligent conclusion. Oral diagnosis should not be considered complete without a general observation and records thereof, as I stated in 1928, before the American Dental Association. There are many conditions that we can observe without asking the patient questions. It happens too often that we see a condition and not the patient. In this day of specialized medicine and dentistry, it is very easy for us to get in a rut and fail to recognize associated conditions which might play an all important part in our final diagnosis. This discussion is not in any way intended to criticize, but to emphasize duties that we owe our patients when we accept the degrees which make us guardians of the health of the mouth, where there are more possibilities for focal infection than at any other point along the alimentary canal. The destiny of human health, of human lives, may depend on our judgment and decisions. Dr. Lyons spoke of the evaluation of the patient's physical resistance. This is an important part of diagnosis, and yet, with all the data available, we sometimes are not in a position to state just how much a patient will probably tolerate. My advice in such cases is to be cautious before proceeding with any operative work. Age, as Dr. Lyons said, is an important consideration, not only from the standpoint of pulpless teeth, but also from that of tolerance for different drugs and of the recuperative powers possessed by those of different ages. Habits are also very important. Leukoplakia patches are usually seen in the mouths of smokers, particularly the pipe smoker. Occupations have marked influence on physical resistance. Coal miners, painters and those confined indoors or those working outdoors show the effects of their occupations. Such observations surely should be recorded before the oral cavity is examined. On examination of the mouth, the following are to be noted: The color of the mucous membrane, character of the saliva, condition of the surfaces of the tongue, whether coated or fissured, with the size of the papillae, and whether smooth and glazed; the number of teeth present, and whether they are regularly formed and placed; the presence of decay, with the type, erosions, abrasions and roughened surfaces; the type of restorative work present, and whether it is in any way causing irritation of the mucous membrane. Then too, we should not overlook the condition of the throat and of the posterior pharyngeal wall, determining whether the tonsils are present and whether the patient has the appearance of having adenoids, and what effect they are apparently having on him. The next routine is the roentgenographic survey. The longer I practice, the more I am convinced that we should take not only a complete set of dental films, but, in addition, extra-oral plates in many cases, together with occlusal films, which are especially valuable in checking the floor of the mouth. I am happy to hear Dr. Lyons say that too much dependence must not be placed upon the roentgen-ray films. I do not think any definite number of films should be advocated. We have a general routine to follow. Fourteen dental films are taken, upper and lower occlusal in approximately 60 per cent of cases, and extra-oral in 40 per cent of cases. That number may not be sufficient in certain cases. We should always bear in mind that we are looking only at shadows and the density of the shadows depends on the character of the tissues involved; also, that various angles will produce different densities; and we may therefore have to make

several exposures for a given area. The various pulp-testing appliances should always be employed. Quite frequently, a picture will appear to be negative, and further tests will prove it to be positive; which indicates that we must not consider the roentgen rays otherwise than as an aid to our findings. Dr. Lyons has gone into quite a lengthy discussion of the maxillary sinus. One should give them serious consideration. The maxillary sinuses are more closely associated with pathologic processes about the teeth than are the frontal, sphenoidal and ethmoidal sinuses. I do not think that it is possible to state how frequently the maxillary sinuses become infected from the teeth, nor does this make any particular difference. If, in sinusitis, there is a suspicion regarding some of the teeth, it is wise to remove any possible chance for reinfection before operating on the sinus. There are cases of sinusitis which do clear up after the removal of infected teeth. Likewise, there are, I believe, cases which do not clear up after operation because infection remains about the teeth. Regardless of the field to which maxillary sinus conditions belong, whenever teeth are removed and there is a direct communication between the mouth and the sinus via the tooth socket, there never should be probing or flushing of the sinus. The one sane procedure is to bring a flap of the mucous membrane over the socket and close it, if possible. This will help retain the blood clot and possibly save the patient an operation and much pain.

ATROPHY AND HYPERTROPHY OF THE MAXILLARY AND MANDIBULAR ALVEOLAR PROCESS AND THEIR EFFECT ON THE STABILITY OF ARTIFICIAL DENTURES*

By F. H. McKEVITT, D.D.S., San Francisco, Calif.

THE words "atrophy" and "hypertrophy" are, as you know, counter terms; the former meaning a wasting away from the want of nourishment or from the disuse of an organ, the latter, an excessive development due to increased blood supply. The purpose of this paper is to describe atrophic and hypertrophic changes in the alveolar process of both jaws and their effect on the stability of artificial dentures; and, strangely, though the terms have opposite meanings, atrophy and hypertrophy may be found there singly or mixed. They have a deleterious effect on the stability and comfort of artificial dentures, from a mechanical standpoint, and an unsalutary effect on the health because of their pathologic nature, as the affected tissues harbor residual areas of infection.

The effects of atrophic changes can better be observed for the purpose of study by two means: first, by skulls, and, secondly, by casts of the jaws and roentgenograms of the teeth and process.

The skull shown in Figure 1 is one of youth; that in Figure 2, of age, vividly recording the end-product of an atrophic change which took place over a period of years.

The best means of recording these atrophic and hypertrophic phenomena is the study cast and the standardized roentgenogram. It is the most practical because of the impossibility, as the skulls

*Read before the Section on Full Denture Prosthesis at the Seventy-Third Annual Session of the American Dental Association, Memphis, Tenn., Oct. 21, 1931.

reveal, of observing the changes during the life span of the patient. We must perforce have an inkling of the atrophic behavior of bone during the brief time that the patient comes under our care. Standardized roentgenograms and casts, then, become the means of observing and recording the status of this progressive atrophy, and, at the same time, of suggesting a method of arresting it.

A study of 1,000 complete roentgenograms reveals three distinct types of bone in the alveolar process. They are the normal (Fig. 3), the hypercalcemic (Fig. 4) and the hypocalcemic types (Fig. 5). These types are readily discernible in the roentgenograms. The illustrations, from everyday practice, are examples of a McCormack roentgenographic technic which involves accurate angulation, timing, exposing and developing of films. Hypocalcemic bone, owing to a hyperactivity of the parathyroids, impoverishing its mineral composition, offers little resistance to the passage of the light ray; hence, the finished picture has a dark appearance by which the hypoplastic quality of the bone is readily identified. The hypercalcemic type is theoretically caused by a hypoactivity of the parathyroids that permits a fall in serum calcium and an excess deposit of calcium in the bone. Because of this richer mineral composition, the trabeculae and their cancellous contents offer greater resistance to the roentgen rays; and, in the finished picture, therefore, the bone has a distinctive white homogeneous appearance which reveals its hyperplastic character. Normal bone in the roentgenogram has a color tone between the hypocalcemic and the hypercalcemic types.

Fig. 1.—Normal skull. Atrophic changes may be observed by the use of skulls. In this normal skull, the distance between the mental foramina and the superior border of the alveolar process is to be compared with this distance in the skull shown in Figure 2. (Figures 1 and 2 are from "Special Teeth for Cross-Bite Cases, by Alfred Gysi, Dental Digest, January-March, 1928.)

Fig. 2.—Edentulous skull. In this skull, atrophy has caused the superior border of the mandibular alveolar process to descend to the plane of the mental foramina. The unabsorbed remnant of the process between the two mental foramina are to be compared with that in Figure 15.

(The terminology "hypercalcemic and hypocalcemic" was suggested by H. S. Spinney, of Santa Barbara, and concurred in by Ralph A. Reynolds, M. D., of San Francisco, whose discussion is appended. There is no exact terminology

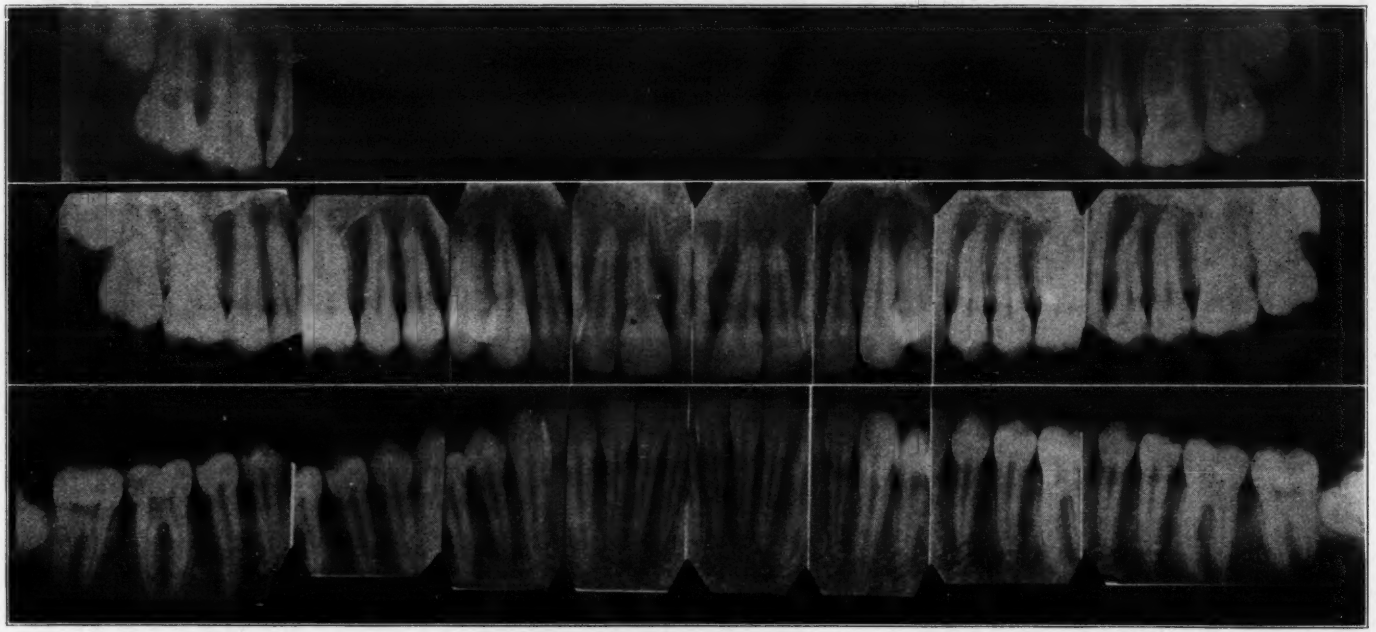

Fig. 3.—Normal alveolar bone type; roentgenographic study of normal alveolar bone for comparison with hypocalcemic and hypercalcemic bone pictures.

Fig. 4.—Alveolar hypercalcemic bone type; roentgenographic study of hypercalcemic bone. The dense appearance of the trabeculae, the color tone and the eburnation at the region of the mesial root of the lower right first molar, also that below the apex of the lower left bicuspid, are to be compared with those in Figure 8. Eburnation, or hypertrophy, is a disease of the bone and does not affect the root. The constricted appearance of the hypercementosed roots is due to hypercalcemic bone density. Artificial dentures built on this type of bone do not lose their stability because of atrophic changes for long periods.

for these types available, and it will be incumbent on the nomenclature committee to pass on the adequacy of the terms submitted. Hermann Becks, of San Francisco, has suggested the terms "hypoostotic" and "hyperostotic.")

The three bone types illustrated are good specimens. The color tones finely contrast with each other and, with the exception of the normal, vividly portray the effects of vitamin and endocrine deficiencies. It is inevitable that some of these types become diseased. When examined by the roentgen rays the similarity of the cancellations and of the color tones in the films of the normal and pathologic aline the one with the other to distinguish the bone type to which it belongs. The dark pictures convey the thought that it will be necessary to rebase or remake artificial dentures within a short period of time because of atrophic changes, while the lighter films indicating dense bone suggest a more hopeful outcome. (Compare Figs. 4 and 6; and 5 and 7.)

Though the color tones of standardized films reflect degrees of bone density, other factors indicating bone types in the roentgenogram are:

1. The solid appearance of hypercalcemic bone trabeculae (Fig. 5), when compared with the lacelike appearance of trabeculae in hypocalcemic bone. (Fig. 4.)

2. The constricted appearance of areas of hypercementosis in hypercalcemic bone (Figs. 6 and 8), when compared with those of profuse hypercementosis of hypocalcemic bone (Fig. 9).

3. Difficulty of absorption of the hypercalcemic bone (Fig. 8), because of which it keeps its relation to the teeth cervices more intimately than does the hypocalcemic bone (Figs. 7 and 10), which seems to seek the plane of the root apices.

4. Eburnation (Figs. 4 and 8), which is indicated by an amorphous white area, generally in the mandible and sometimes in the maxilla, and which is seldom present in hypocalcemic bone. Patients having hypercalcemic bone generally continue through life with their full complement of natural teeth. The percentage of hypercalcemic type edentulous cases is low (about 20 per cent).

Thus, it may be assumed that the greater number of all edentulous cases fall into the class of the normal and hypocalcemic bone types and that, in those cases, bone atrophy will progress to a greater or less degree, thereby affecting artificial denture stability, and more so in the case of wasting diseases and faulty nutrition.

CLINICAL BEHAVIOR OF ALVEOLAR BONE

A few words relative to the clinical behavior of these three distinctive bone types will not be amiss. Normal bone does not seem to exhibit anything unusual clinically as do the hypocalcemic and hypercalcemic types.

The hypercalcemic type of bone, when pathologic, is most prone to osteitis or development of the so-called dry socket. Its density reduces bone vascularity to a minimum. Any attempt to penetrate it with a needle point will fail. Chisels are needed to chip the bone for delivery of the tooth or teeth without breaking them.

Hypercementosis of the roots of the teeth in this hypercalcemic type (Fig. 8), differs from that of hypocalcemic bone (Fig. 9). Because of its density, the cementum is restricted in its lateral development, and, for this reason, escapes the observation of the casual observer when viewed roentgenographically.

Fig. 5.—Roentgenographic study of hypocalcemic alveolar bone. The dark color tone and especially the wide open spacing of the trabeculae are to be noted. In this type of bone, artificial dentures should be remade every third year to keep pace with atrophic changes.

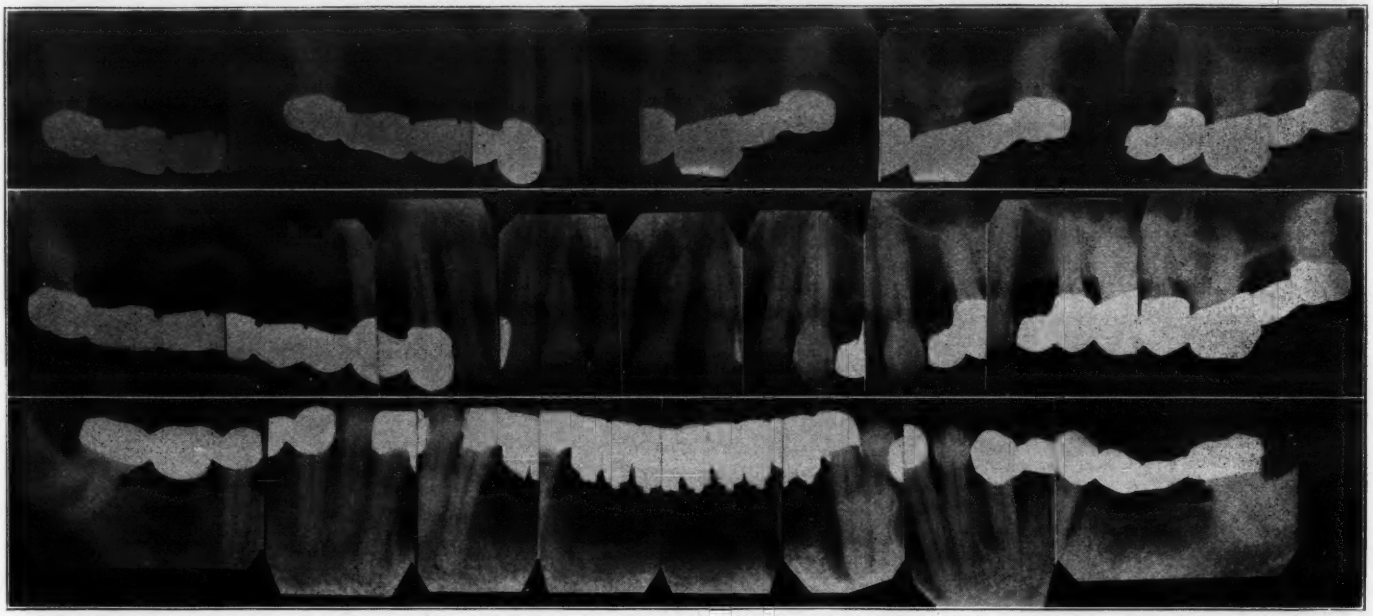

Fig. 6.—Hypercalcemic bone pathologically involved. Atrophic changes in this bone type progress slowly. The roentgenogram depicts a stage in the progress of the atrophy. The constricted appearance of the hypercementosed roots is due to hypercalcemic bone density. The areas of cancellation in this and Figures 5 and 7 are to be compared morphologically and the contrast in color tone is to be noted.

A probable cause of hypercementosis may be of interest. Key[1] says (p. 1669): "A further example of the resistance of living bone to pressure is found in those cases of chronic arthritis in which the cartilage has been eroded from the ends of the bone and the bones have borne weight over a period of years. Not only have they borne weight, but they have been subjected to friction during much of this period. These bones are not eroded, but the surface region becomes hard and ivory-like in consistency and takes a high polish."

I believe that a similar action induces hypercementosis; it being an example of the reaction of living cementum to pressure. A tooth in the alveolus is a joint and the peridental membrane is comparable to the cartilage in a long bone joint. Pressure applied to the tooth erodes the peridental membrane, and the loss of its cushion effect results in friction that stimulates cementum growth, the area of hypercementosis condensing to the same relative density as the hypercalcemic or hypocalcemic bone that surrounds it. Areas undergoing hypercementosis may be classed with heterotopic bone formations. Wasson[2] says: "The heterotopic formation of bone is not understood. Such deposits are found in the mammae, tonsils, eyes, muscles, etc." To these we may add such heterotopic calcium formations in bone tissue as are seen in otosclerosis and juvenile sclerosis; and in the teeth and jaws, in hypercementosis, in the presence of pulp nodules and in eburnation, and in torus palatinus and torus mandibularis. Hypercementosis may be attributed to the combined influence of pressure and a hormonic dysfunction of parathyroid glands which regulate calcium metabolism.

Hypercementosis usually takes place on the roots of bicuspids, cuspids and molars and on incisor roots where the bite is end to end. Normal overjetting and prognathic underjetting incisors are not as a rule involved. In the case of single extractions in hypercalcemic bone, if adequate drainage is not established by breaking down the remaining buccal alveolar plate almost to the root apex, osteitis is inevitable. Eburnation results in an ivory-like island of calcific material appearing in the roentgenogram as an amorphous white area. When so recorded in the picture, this is an infallible index to this type of bone. It is probably due to intermittent pressure on a tooth or teeth.

Discussing pressure absorption, Key[3] says: "In the case of pressure, it may be accepted as proved that if the force which a bone is called on to resist is increased, the tendency of the bone is to hypertrophy and become stronger. This would indicate that pressure tends to cause bone hypertrophy rather than absorption." My observation of alveolar bone checks with Key's statement, with the exception that the hypertrophy in the alveolar process in the form of eburnation due to intermittent pressure from a tooth occurs in hypercalcemic bone only, and that similar pressure in hypocalcemic bone will cause absorption or osteoporosis.

The area of eburnation, a form of hypertrophy, is detached from the teeth, and it is usually allowed to remain *in situ* unless causing pressure on nerve tissue; when brought to the surface by long continued atrophic changes, or when surrounded by decalcified bone as shown by a demarcation line in the

1. Key, J. A.: Atrophy of Bone, J. A. D. A., 18:1658 (Sept.) 1931.

2. Wasson, W. W.: Physiologic Growth of Bone, J. A. D. A., 17:1658 (Sept.) 1930.

3. Footnote 1, p. 1667.

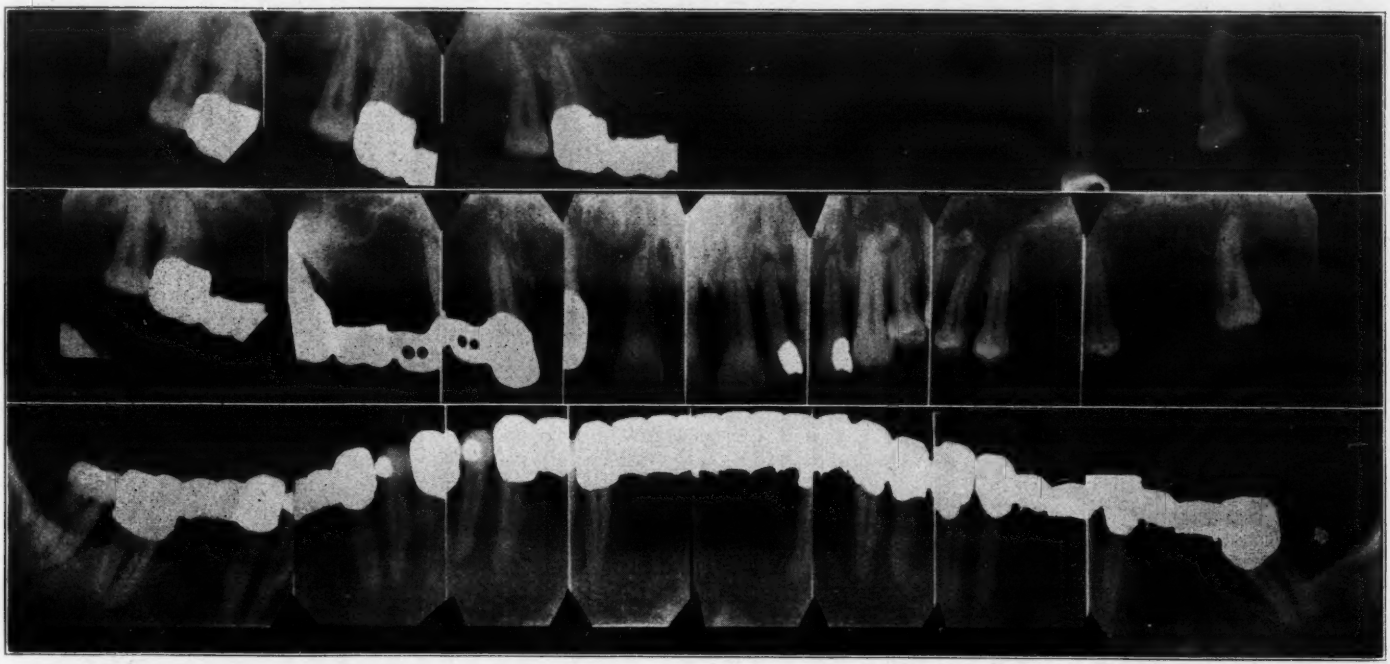

Fig. 7.—Hypocalcemic bone pathologically involved; roentgenographic study. This is the status of atrophy as it is revealed by the roentgen rays. The color tone and the trabeculae are to be compared with those in Figure 6.

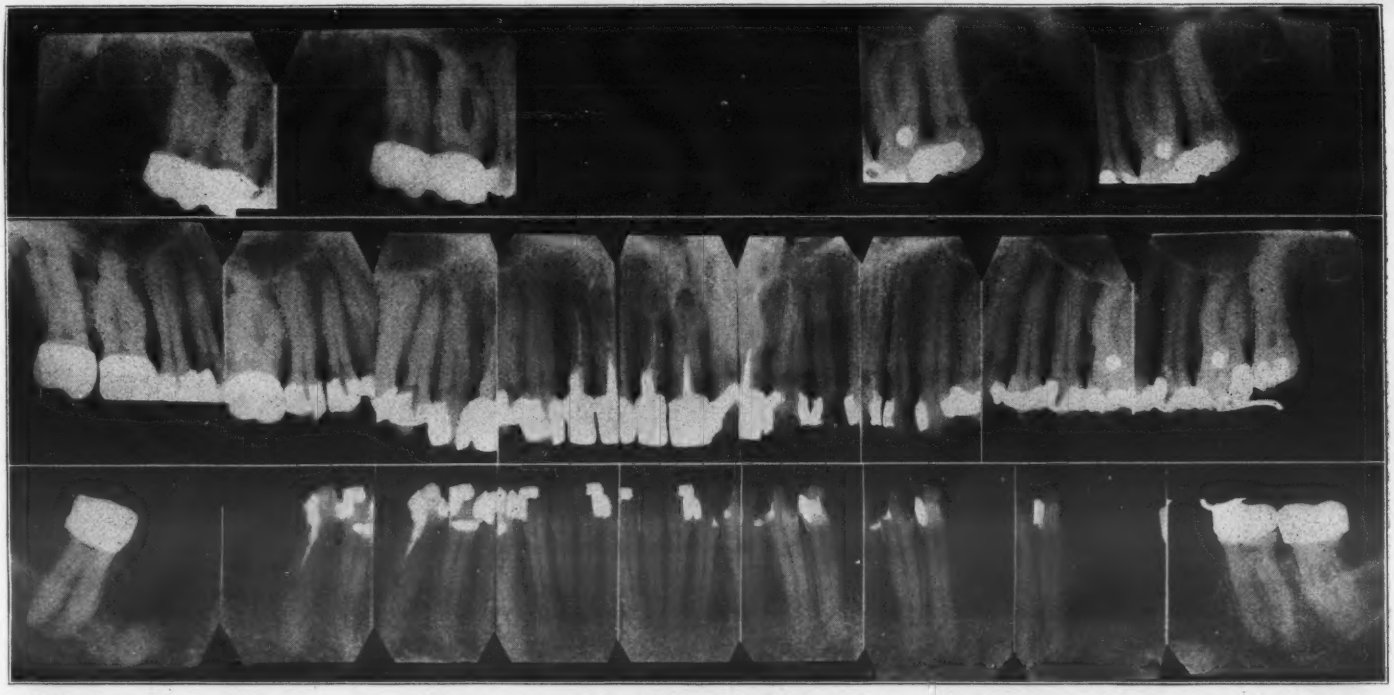

Fig. 8.—Roentgenographic study of hypercementosis in hypercalcemic bone, showing the effect of hypercementosis and its restricted development in this type of bone. The areas of eburnation on the right and left in the edentulous areas are to be compared with those in Figure 4. Isolated teeth in hypercalcemic bone show little tendency to migratory movement. The bone level remains close to the tooth cervix.

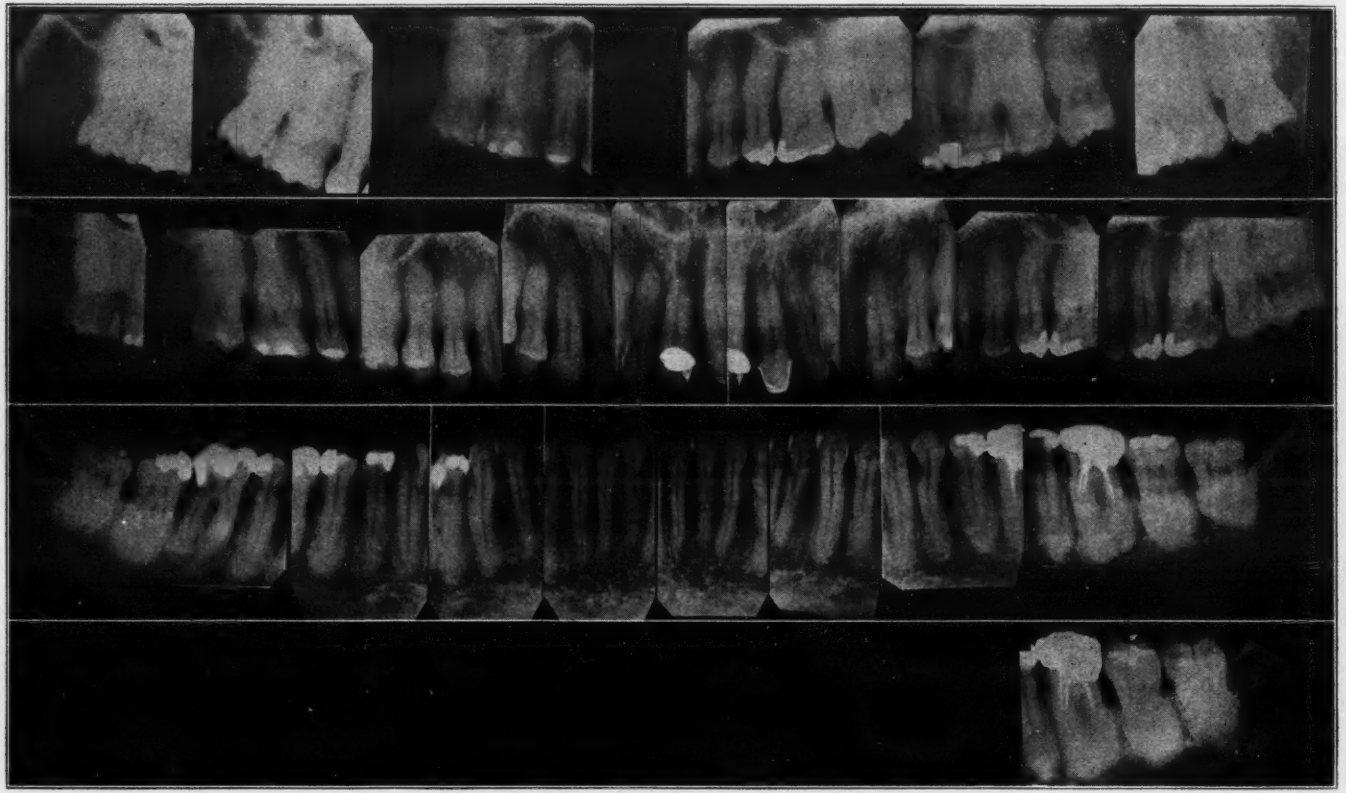

Fig. 9.—Roentgenographic study of hypercementosis in hypocalcemic bone. Profuse hypercementosis is an index to this type of bone. The roots in this case are to be compared with those in Figure 8, and the outline of the roots in the new cementum growth is to be noted.

roentgenogram. In the hypercalcemic type, isolated teeth have not the same migratory tendency as have isolated teeth in hypocalcemic bone. When this bone type is encountered by the orthodontist, the movement of the teeth by traction is either slow or fails altogether. It has one redeeming feature; upon it, artificial dentures retain their stability for long periods.

Hypocalcemic bone permits of easy extraction. The teeth respond readily to orthodontic movements. When pyorrhea (Fig. 10) involves the process, it recedes like a tide. Cysts (Fig. 11) assume a greater size in this type of bone than in the normal or the hypercalcemic type, and dentures soon lose their stability. Hypercementosis has a freer development. The vascularity of this bone is greater than in the hypercalcemic type.

Hypocalcemic bone is less resistant to atrophic changes, while the hyper-calcemic type resists atrophy.

THREE TYPES OF ATROPHIC CHANGE IN THE ALVEOLAR PROCESS OF THE MANDIBLE AND THE MAXILLA

After teeth have been extracted, atrophic change in the alveolar process of both jaws is, as a rule, constant, whether the bone is of the normal, hypocalcemic or hypercalcemic types. It causes the loss of centric relation of artificial dentures, thus affecting their stability. Therein lies the most insidious factor in the lack of uniform success in denture construction; hence, the need for rebasing or remaking artificial full and partial dentures built upon transitory foundations of cancellous bone, particularly when indifferent surgical work (Fig. 12) has been employed.

Uniform Alveolar Atrophy.—Atrophy takes three distinct forms which can be regarded as typal. The first of these three types to be described, a uniform alveolar atrophy (Fig. 13), is remarkable for its rapidity of action. In extreme cases, it denudes the nerve tissue emanating from the mental foramina of its bony housing to such an extent that this tissue can be felt with the fingers. The distinguishing feature of this atrophy, which also occurs in the maxilla, is the thoroughness with which it absorbs the alveolar process and also the overlying soft tissue. The absorption of the bone and soft issue takes place with such uniformity that the result is a glovelike fit of the membrane over the edentulous bone. Key,[4] referring to senile atrophy, says: "What really happens is that the equilibrium between bone absorption and the new bone formation is upset and the absorption gradually predominates. Not only is there a progressive loss of bone substance on account of the negative balance, but there is some deterioration in the quality of senile bone." The internal oblique ridges of the mandible are brought into sharp relief and the nerves emanating from the mandibular mental foramina, on the right and left sides, rest beneath the membrane and directly on the bone. Any pressure from a well-fitting denture which impinges on the ridges and the nerves produces pain and denture instability. The nerves should never be incised. The denture should be relieved instead, as an incised nerve will benumb the lip. When the internal oblique ridge is to be operated on, the incision is made on the body of the mandible and the mucous membrane is retracted lingually. The sharp ridge is reduced with the rongeur and dressed with the file.

Serrated Mandibular Alveolar Atrophy.—The second form of atrophy which is frequently met with in practice

4. Footnote 1, p. 1665.

this case are to be compared with those in Figure 8, and the outline of the roots in the new cementum growth is to be noted.

Fig. 10.—Hypocalcemic bone affected by pyorrhea. If the bone in this type will absorb while the teeth are present, it will continue to absorb in the edentulous space. Artificial dentures must be made every third year or oftener to keep pace with atrophic changes.

Fig. 10.—Hypocalcemic bone affected by pyorrhea. If the bone in this type will absorb while the teeth are present, it will continue to absorb in the edentulous state. Artificial dentures must be made every third year or oftener to keep pace with atrophic changes.

Fig. 11.—Cyst in hypocalcemic bone. These cysts develop rapidly, because of nonresistance of the bone to atrophic changes. The isolated lower left molar has a migratory tendency in this bone type. The lower right second molar is in contact with the lower second bicuspid.

is called serrated mandibular alveolar atrophy. Figure 14 shows a roentgenogram and cast of a mandible before and after operation. The condition usually occurs in the hypercalcemic type of alveolar bone where the progress of the atrophic change is resisted. A thin high ridge of bone in the mandible is the end-product of this atrophic change. One of the effects of the presence of the ridge is pain on pressure from the denture, which militates against the stability and the efficiency of the artificial replacement. The portion affected can also be regarded as a residual area of infection. A similar ridge (Colburn[5]) occurs in hypocalcemic bone, but the lateral and vertical pressure of masticating force seems to level it effectively, whereas, in the hypercalcemic type, surgical interference is indicated. To operate in these cases, a central vertical incision is made lingually in the median line. The succeeding incision is made laterally (Fig. 14), thus permitting the elevation of the periosteal flap linguolabially with greater ease. When the process is exposed, it is reduced with rongeur forceps and dressed with the file. The flaps are neatly trimmed and no sutures are employed.

Mixed Alveolar Atrophy and Hypertrophy.—There is a third distinct form of atrophy of the alveolar process, a "mixed alveolar atrophy and hypertrophy" (Fig. 15). Its distinguishing feature is the complete loss of the alveolar bone and the retention of the soft tissue accompanying it. This mixture of atrophy and hypertrophy is of more frequent occurrence in the maxilla than in the mandible. In the roentgenogram of the maxilla, the flabby ridge of hypertrophied soft tissue appears as a gray mass below the bone line. This is probably due to a long continued hyperfunction of the parathyroid, resulting in withdrawal of an excessive amount of calcium from the bone and producing, according to Becks, a form of osteodystrophia fibrosa.

This condition is made worse by the too long retention of the six lower anterior teeth, for, when a lower partial denture, which may have been either occluded or articulated, settles as a result of atrophy, it permits the maxillary process to take the impact of closing. The loss of the natural teeth is hastened, and where they remain, they break down the anterior superior ridge because of the lack of balance in the posterior ridges, and, in cases of hypocalcemic bone, the destruction of the process is completed and continues into the maxillary bone itself, leaving a flabby ridge of movable soft tissue which is conducive to denture instability. The first incision for this operation is vertical. It is made labially in the median line, and thence laterally on the ridge crest to the tuberosity. The flaps are elevated and the process, which is smoothed if necessary, is exposed. The soft fibrous tissue is cut with the Mayo scissors from within outward, the pink membrane, which is not reduced until the flaps are approximated, being conserved.

THREE TYPES OF HYPERTROPHIED MAXILLARY TUBEROSITIES

Hypertrophied maxillary tuberosities are of interest for two definite reasons: primarily, because of their pathologic significance and, secondarily, because they constitute a mechanical obstacle to the successful wearing of artificial dentures. They usually develop while the natural teeth are present, assuming one of three

5. Colburn, W. A.: Surgery Favorable for Dentures, Pacific D. Gaz., 27:265 (May) 1919.

Fig. 12.—Incomplete operation; cast and roentgenogram showing the result of indifferent surgical handling of dental extractions, which is conducive to rapid atrophic changes and denture instability.

definite forms or types in the edentulous mouth if no attempt is made to remove them at the time of the extractions.

Lingual Alveolar Hypertrophied Tuberosities. — The first, for descriptive purposes, of the lingual alveolar hypertrophied tuberosities is of soft tissue. It takes form with a 2 mm. thickening of the gingival tissue, in the lingual region of the first bicuspid, gradually widening to 10 mm. as it reaches the third molar and tuberosity region. Figure 16 shows this type before and after the reduction of the area of hypertrophy, the pencil line indicating the location and the extent of the incision. This condition occurs not only unilaterally (Fig. 17), but also bilaterally (Fig. 17). In the bilateral form, the hypertrophic tissue (soft) partially fills the vault of the mouth and takes up space occupied by the tongue. The area of thickening begins at the cervices of the bicuspid teeth, as in the unilateral form, and it has its widest dimension in the tuberosity region. It then spreads upward toward the median raphé where the two lingual surfaces occlude, before reaching the median line (Fig. 17). It develops, in some instances, a pebbly surface, and the tissues have a leathery consistency when incised. The patients have very sensitive palates. When operated on, this tissue responds gratefully. The hypertrophic tissues return to normal, and more readily if the underlying bone has undergone curettage.

Buccal Alveolar Hypertrophied Tuberosities.—The second type, buccal alveolar hypertrophied tuberosity (Fig. 18), develops buccally, and if not removed when the teeth are extracted, its rounded form leaves a deep undercut. This also occurs unilaterally and bilaterally. The condition is usually confined to the tuberosity region, though, in some instances, it extends to the cuspid tooth on the same side. The globular vestige of the normal tuberosity presents a deep undercut and is filled with decalcified material. When its bony casing is penetrated, it yields readily to curettage.

Vertical Alveolar Hypertrophied Tuberosities. — In a third instance, the growth of hypertrophied tuberosities is vertical, and reaches to the superior border of the body of the mandible. When incised, the tissues present a tough, white, fibrous appearance, and are highly resistant to any but the sharpest knife or scissors. This type, when operated on, should be incised on the ridge crest and curved Mayo scissors used to reduce the tissue; which should be done from within outward, the pink mucous membrane being left intact until the flaps are approximated. The bone is then curetted and the flaps are trimmed.

In Figure 19, the roentgenogram is of the same case as the casts. The right tuberosity in the picture shows as a gray mass. It is of hypertrophied soft tissue. The film in the upper left corner of the picture shows the relation of the hypertrophied tissue to the superior border of the mandible and to the enamel cap of the inferior molar on the same side.

Aside from their pathologic significance, these three types of hypertrophied tuberosities present mechanical obstacles to the fitting and wearing of dentures, as they do not permit the correct tracing of the gothic arch or the placing of sufficient baseplate material to carry artificial teeth.

It is my opinion that there are several possible means of fortifying against atrophic changes that make for artificial denture instability: (1) proper surgical procedure, (2) good prosthetic dentistry and (3) vitamin and glandular therapy.

The first of these is the most impor-

tant, and it devolves on the exodontist to interpret the roentgenogram, which should be complete, and to have casts of both jaws, edentulous or otherwise, before proceeding surgically; for it must be borne in mind that the prosthodontist is called on to care for a generation that is passing and that endocrine and vitamin deficiencies have wrought their havoc, leaving a residue of atrophied and hypertrophied tissues such as I have described; and therefore the corrective measure must be surgical. This, if properly performed, permits of denture stability, better mastication and consequently better food assimilation and a restored hormonic balance. Vitamin therapy and ultraviolet ray treatment, coupled with glandular treatments, might, if intelligently understood and applied, promote the fixation of bone. It is assumed that the prosthodontic steps in these cases will be given proper consideration and therefore lend to bone conservation.

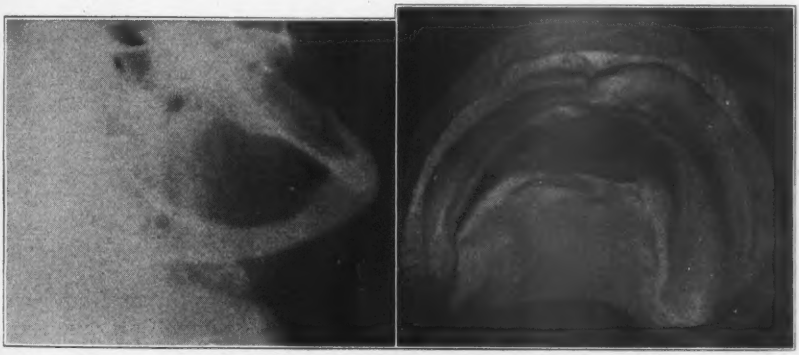

Fig. 13.—Uniform alveolar atrophy; a cast and roentgenogram showing uniform alveolar atrophy where loss of soft tissue keeps pace with loss of bone. The nerves emanating from the mental foramina are resting on the body of the mandible beneath the mucous membrane. The sharpness of the internal oblique ridge is to be noted.

EXODONTIA

After the mechanics of the operation are planned, there are three objectives: (1) to combat the atrophic changes attending the loss of the teeth and the process; (2) to remove the pathologic tissues, and (3) to prepare the ridges for the reception of the dentures.

The surgical operation itself is divided into steps under general anesthesia. One-half of the maxilla is taken at a time, whether edentulous or otherwise, then one-half of the mandible on the same side. This procedure is followed to the opposite side; which makes an orderly succession of four steps. A lateral incision bisects the frenum, and is succeeded by a vertical central incision; the gum attachment is freed at the cervices of four teeth and the periosteum is elevated, exposing the process covering the roots; a chisel is used to chip away enough bone to permit of the teeth being tilted out labially or buccally, as the case may be, and rongeur forceps are employed to reduce the sharp interseptal bone, which, in turn, is smoothed with a file. Bone hemorrhage is taken care of with a bone hemostat before the site of

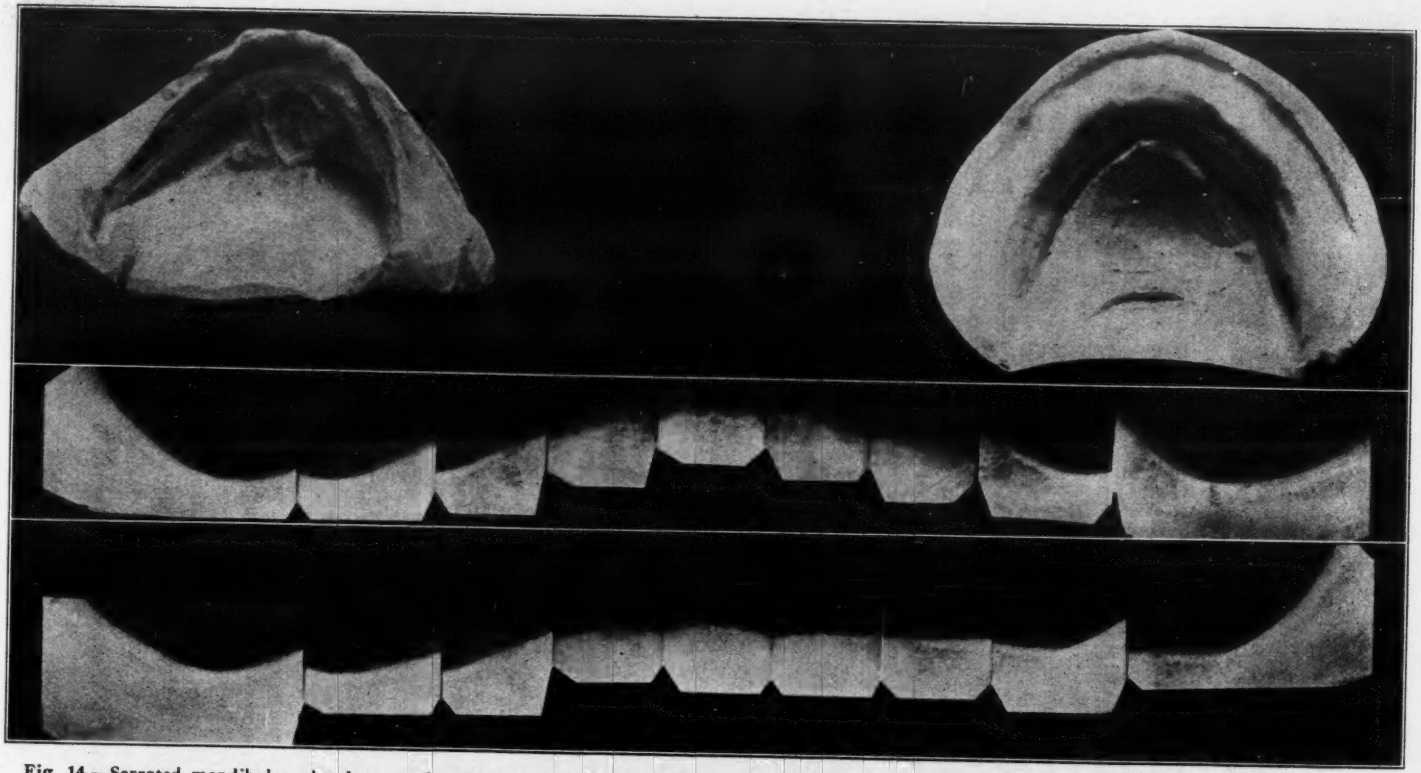

Fig. 14.—Serrated mandibular alveolar atrophy; before and after surgical interference. The black line indicates the operating incision. (Operation suggested by Colburn.)

gested by Colburn.)

line indicates the operating incision. (Operation sug-

Fig. 15.—Mixed alveolar atrophy and hypertrophy; cast and roentgenographic study of third form of atrophy of alveolar process described in text. This is a case of mixed atrophy and soft tissue hypertrophy or osteodystrophia fibrosa. The gray mass in the pictures, extending from one tuberosity to the other in the maxilla, gives an idea of the vertical dimension of the soft tissue and the extent of the alveolar bone atrophy. In hypocalcemic bone, the prolonged retention of the lower anterior teeth hastens the loss of the superior alveolar process.

the extractions is left. The same procedure is followed to the region of tuberosity, and the flap is brought down and neatly trimmed with Mayo scissors.

Drainage is a surgical principle and should be stressed. In our work, as we are dealing with bone, the fewer sutures, the better; one tack in the median line being sufficient to approximate the tissues separated by the vertical incision. It is my opinion that a good clot will serve the purpose of sutures and will keep the buccal attachments from being brought to the ridge crest, where later they might have a tendency to dislodge the denture. Postoperative treatment includes maintenance of drainage. If the parts swell, and a hematoma results, it is opened gently with a blunt instrument.

In hypercalcemic cases, if this procedure is followed, the same dentures can be used for five years without change. In the hypocalcemic bone cases, three years seems to be the limit, and in cases of wasting disease and of faulty nutrition, they must be renewed or rebased more often.

In order to add clearness to this brief description of atrophy and hypertrophy of the alveolar process and their effects on the stability of artificial dentures, it was thought desirable to depart from the traditional method of submitting a mass of matter and, instead, to furnish a rapid though comprehensive survey of outstanding cases, such as would convey the potentialities of casts and standardized roentgenograms as a proper index to mouth conditions of patients who have worn or who require artificial dentures, with the single idea of combating atrophic changes that tend to be minimized in the eyes of the operator because of the insidious action of bone atrophy, superinduced by endocrine and vitamin deficiencies. It is hoped that the statements and suggestions contained herein will add to the obviously growing desire of the profession to master this seemingly unsurmountable phase of prosthodontia.

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DISCUSSION

Frederick F. Molt, Chicago, Ill.: Dr. McKevitt, in dwelling on the diagnostic possibilities in predenture cases, presents much of value. The rapid changes that occur in some mouths, as in contrast to others, have been a source of distress to both patient and prosthodontist. The average patient cannot understand why his case should require rather frequent rebasing, while some one or other of his friends has worn dentures for a period of years without marked changes in the mouth. The result is frequently condemnation of the dentist who has made the dentures, and perhaps a change of dentists. Too often, if surgical preparation of the mouth has been made, that fact is grasped as an alibi, and thus the stigma is shifted to the exodontist. Now, we are presented with a classification of cases, roentgenographically, which, properly worked out, would make it possible not only to anticipate in a great degree the probable rapidity of absorption, but also to prepare the patient for whatever situation may be encountered. Discounting the length of time that some patients assert that they have worn their dentures and making allowances for those cases in which dentures are being worn that should long since have been discarded, we still must realize that there is a vast difference in the bony structures of the jaws, and this is reflected in the rapidity of absorption. No one is more familiar with the density variations than is the exodontist who has had to learn from the study of his roentgenogram when to expect a comparatively easy extraction and when a difficult one in cases presenting similar teeth but different bone texture. Again, these cases of heavily calcified bone prepared for dentures by extraction show a comparatively slight amount of absorption in contrast to those of light calcification. In the latter, given time for absorption, we often come fairly close to an ideal result; but, of course, in these cases, there are always to be considered the advantages accruing from the

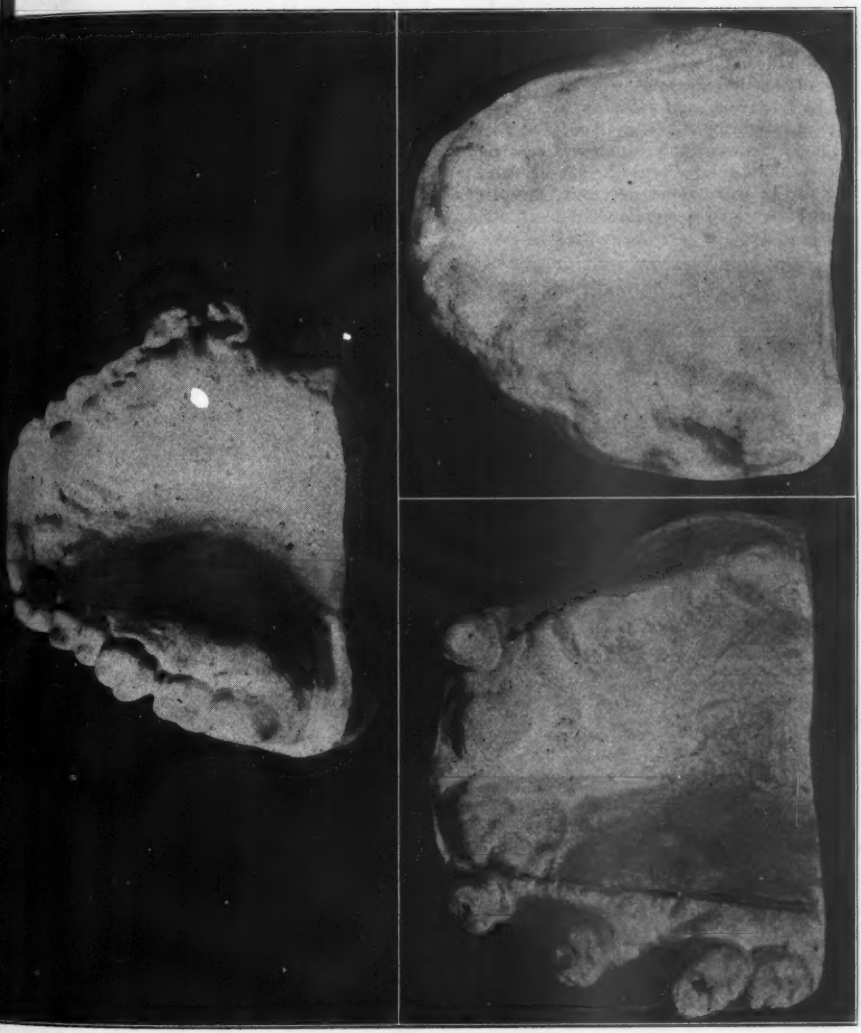

Fig. 16.—Lingual alveolar hypertrophied tuberosities. The upper cast shows a unilateral form of typical lingual alveolar hypertrophied tuberosity. The lower left cast is also typal and shows the line of the operative incision. The cast below, right, shows the condition after the operative procedure.

immediate denture construction, made possible by surgical preparation. The roentgenographic illustrations, were we not so informed, would readily be identified as the work of McCormack. An artist in his work, he has the ingenuity and originality to depart from routine dental roentgenograms and has produced this incomparable type of oral panorama. A layman, unfortunately, but a layman better informed on the anatomic and pathologic deviations disclosed by oral roentgenograms than a large majority of the dentists doing like work; some university dental department would honor itself by conferring an honorary degree on this man. The average roentgenographic product is too far from being "standardized" to be a dependable basis for such determinations as Dr. McKevitt outlines. Many factors must be coordinated and much nicety of judgment must enter into the making of the roentgenograms; to ignore the diagnostic study of the completed work. On the technical side, we have a "fixed" exposure comprising milliamperage, voltage, filament control, target distance, timing and the positioning of both film and patient; these to be followed by processing with identically charged solutions, of fixed temperature and definite developing time, proper fixing and washing. All of these items must be duplicated not only from case to case during the course of a day, but also from day to day and week to week. Many laboratories are not so accurate. The physical factor, which is less mechanical, in the diagnosis, involves distinguishing between cases, young or old, thick bone or thin, heavy patients and light, with the tissue that must be penetrated and that does cause some deviation. In some of these cases, our "fixed" exposure technic must be departed from to a slight degree; just how much must be determined by that "nicety of judgment." A third consideration that may logically be included in this discussion is the fact that, if such roentgenography *can* be produced for the dental profession, it cannot be

Fig. 17.—Lingual alveolar hypertrophied tuberosities. The upper and lower left cast show a bilateral form of typical lingual alveolar hypertrophied tuberosity. If these hypertrophies are not reduced when the teeth are removed, they continue to develop and fill the vault of the arch, depriving the tongue of its space. The cast below, right, shows the condition described.

done for a $5 or even a $10 fee. It is a professional service and warrants a professional fee. Assuming that the dental profession outside San Francisco may be provided with such roentgenography, we must have a more widespread realization of the diagnostic possibilities provided thereby and must make an earnest effort to differentiate between cases, instead of classifying all denture cases, as heretofore has been done, in one group. Dr. McKevitt gives us a logical and, in a large degree, original classification. I am inclined to question the validity of the coined term he has used to describe these osseous deviations. "Calcemic" and "calcemia" are hybrid derivations from the Latin "calx" (lime), and the Greek "haima" (blood), and would necessarily be applied to the blood-calcium proportions. The blood-calcium is not necessarily an index of bone calcium content since, particularly in adults, there may be a marked difference. It would seem, therefore, that "calcic," "calcareous" or "calcified," with the prefix "hypo" or "hyper," would be preferable from the standpoint of accuracy and descriptiveness. Actually, in spite of the number of investigators delving into the subject, we know comparatively little of calcium and phosphorus metabolism. Many theories have been advanced and many dietary fads formulated, but we are still in a state of flux. It would seem to be definitely established that vitamin D is a, or the, most potent factor and that by accelerating the solubility of calcium and phosphates in the blood stream, it also increases deposition in the bones. This applies to children, but not in so marked a degree to adults. Calcium and phosphorus are absorbed from the intestine; therefore, the richness of the food in these elements, or the poverty, must necessarily be a first consideration. Another determining condition is the amount excreted by the kidneys. More recently, it has been discovered that vitamin C in adequate amounts must be provided or vitamin D will apparently not be able to

Fig. 18.—Casts showing buccal alveolar hypertrophied tuberosities. If the hypertrophied tuberosity shown in the upper cast is not removed at the time of the extraction, it will retain its form as in the edentulous arch on the lower left. The cast on the lower right shows a bilateral form. These usually contain decalcified material. The undercuts they present constitute mechanical obstacles to successful denture wearing as they do not permit of sufficient baseplate material nor the making of a gothic arch tracing.

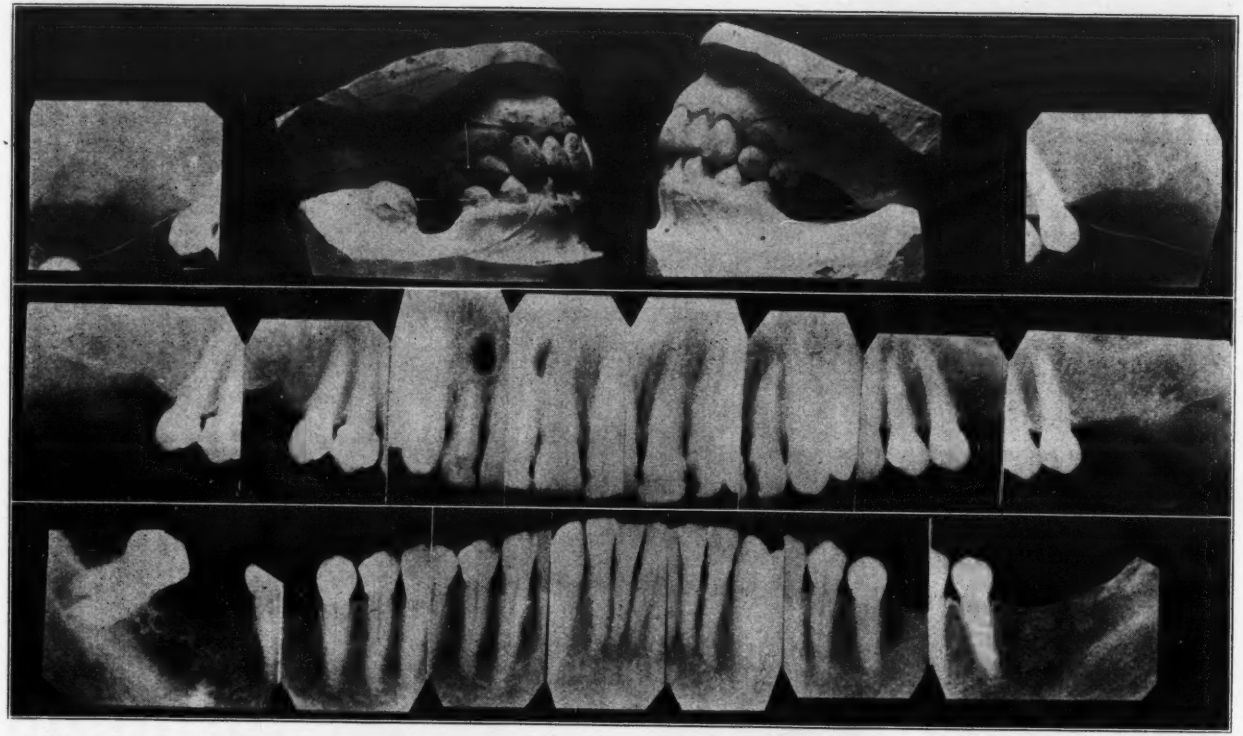

Fig. 19.—Vertical alveolar hypertrophied tuberosities; roentgenogram and casts showing soft tissue hypertrophy of maxillary tuberosities extending vertically. This picture accompanies casts of the same case showing right and left sides. In the film above, left, the enamel cap of the mandibular molar can be seen. The gray mass is soft tissue (compare cast above, left). The film above, right, shows soft tissue reaching to the superior border of the body of the mandible (compare cast above, right.)

function freely. Just what action, if any, the thyroid or parathyroid exerts is still a question, although there is apparently some definite relation. If, in time, a clinical procedure may definitely be worked out, and it is quite possible that it may be, by which we may artificially control the mobility and deposition of calcium and phosphorus even in adults, it will be a boon to many, but particularly to the edentulous patient. Perhaps as an incident to this achievement, we may be able to check or prevent dental caries and our dental and our denture "problem" will give way to one of "employment for indigent dentists." Dr. McKevitt speaks of hypertrophied tuberosities, found particularly in cases showing imperfect calcification, as being pathologic, and I would ask him to enlarge on this feature of his paper. We are familiar with tissue hypertrophy which is readily reduced by operation, and with the bulbous tuberosities in which we find a thin shell of compact bone containing a mushy yellowish, spongy bone exceedingly deficient in cancellation. In a large majority of these cases, no apparent contiguous source of infection exists, nor can any history of past pathologic involvement be determined. Once opened, the entire structure crumbles like an egg that has been smashed, leaving no substantial ridge or tissue support. Curettage must be performed on general principles and superfluous tissue eliminated. Since laboratory examination of the contents of many such tuberosities has failed to determine the existence of any pathologic condition, we have viewed these principally from the mechanical standpoint of preparation for dentures. The differentiation between the types of hypercementosis in cases of increased or decreased calcification is an interesting one. From the standpoint of the exodontia problem, unless the situation is analyzed, any hypercementosed tooth is likely to be regarded with apprehension. Actually, the enormous hypercementoses present no more difficulty in extraction in the hypocalcified cases than do normal tooth roots, less frequently because the bony structure has often been perceptibly reduced by pressure atrophy. In the hypercalcified case, on the contrary, any degree of hypercementosis, particularly of a pulpless tooth, may be expected to complicate the extraction. As our knowledge of calcium metabolism increases, we may, perhaps, learn the reason for these anomalies, as well as for eburnation, sclerosis and the presence of the bony excrescences found so often on the lingual surface of the mandible and in the palate. Added diagnostic knowledge and accuracy in prognosis not only in anticipated denture construction but also in routine extraction and in work in oral surgery, cannot but be of advantage to both operator and patient.

W. H. Wright, Pittsburgh, Pa.: Dr. McKevitt's paper deals with a problem of utmost importance to prosthodontia; namely, changes in denture supporting tissues which destroy the retention and stability of dentures. I am satisfied that the chemical composition of underlying osseous tissue has much to do with the successful wearing of dentures, yet I am not certain that we have, at present, an accurate method either for determining the quality of bone or for carrying out dietetic treatment in unfavorable conditions. I agree with Dr. McKevitt that soft tissues which interfere with the stability of dentures and osseous tissues which interfere with comfortable denture service should be removed before dentures are made. I prefer the removal of the least possible amount of alveolar process consistent with comfortable and efficient denture service. It is my opinion that the prosthodontist is by no means confined to caring for a generation that is passing. At present, it is appalling how many young adults require dentures. This younger generation expects from thirty to forty years of denture service, and the prosthodontist must conserve the denture supporting tissues in order to assure comfortable and efficient service in the future. There is one factor which must not be overlooked in dealing with changes in the denture supporting tissues; namely, that the residual ridges are normally subject to atrophy. When the teeth are lost, the alveolar ridge has served its natural purpose, and thereafter it continues to atrophy with greater or less rapidity, thus depending on the individual patient. Occasionally, a patient may wear dentures for a few years without loss of balanced occlusion, but, as a rule, mucosa-supported dentures require corrections quite frqeuently in order to avoid traumatic destruction of the underlying tissues. Atrophic changes are not confined to denture supporting tissues, but may also involve the alveolar tissues under bridgework. Figures 6 and 7 demonstrate rarefaction of the alveolar process due to lack of function

reaching to the superior border of the body of the mandible (compare cast above, left). The film above, right, shows soft tissue

resulting from protection afforded by bridges. This lack of use ultimately leads to atrophic changes such as Dr. McKevitt has described, and predisposes the alveolar tissues to rapid resorption after dentures have been constructed. I should hesitate to specify the length of service which might be expected of a restoration since the conditions on which this service depends are numerous and obscure. I prefer to explain the probabilities to the patient and subsequently to maintain the denture in a serviceable condition with the means which the prosthetist has at hand. In the past, our tendency has been to do too much surgical work. I trust that Dr. McKevitt's paper will be a step toward a better understanding of conditions, and conservative operative work which will consider the patient's future of more importance than the surgical whims of the present.

Ralph A. Reynolds, San Francisco, Calif.: In commenting on Dr. McKevitt's paper, I can only touch on the possible relation of endocrine imbalance to alveolar bone and buccal tissue changes which he has so clearly set forth. He has classified, for convenience, the alveolar bone changes most commonly encountered, into hypocalcemic, hypercalcemic and normal. In applying these terms to the calcium content of bones as revealed by roentgenography and pathologic examination of removed bone, one must not necessarily assume that hypercalcemia or hypocalcemia of blood serum also exists. In the case of long bones particularly, it is true that a hypocalcemic condition of the bones can be present, together with hypercalcemia of the blood. It is a well-known clinical fact that in cases of hyperplasia of the parathyroid glands and in cases in which the calcium content of the food is normal, there is a high serum calcium, but usually a decalcification of the bones, particularly the long bones of the body. In experimental removal of the parathyroids, the subject very quickly develops hypocalcemia of the blood serum and tetany. Removal of hyperplastic parathyroid tissue in cases with high blood calcium will likewise cause a rapid fall in the level of blood serum calcium. The parathyroids then function normally to aid in the maintenance of calcium balance both of the blood serum and of the bones. Other conditions operate to help in this same balancing mechanism. Jones, Rapaport and others, in a recent issue of the *Journal of Biological Chemistry,* have demonstrated that by feeding concentrated solutions of irradiated ergosterol or vitamin D and a diet normal in calcium, a pronounced hypercalcemia of the blood serum will result within two weeks. If the diet is calcium free, feeding an excess of irradiated ergosterol will cause little elevation of serum calcium. We see then that, although when an excess of parathyroid hormone exists in the body, calcium is mobilized in the blood serum at the expense of the bones, when such a parathyroid condition does not exist, an excess of ergosterol will take little or no calcium from the bones. In the latter case, ergosterol will mobilize only whatever calcium may be contained in the food. Aub and Salter have recently demonstrated that calcium fails to be deposited in bone when the diet, though adequate in calcium, is deficient in vitamin C. The subsequent addition of vitamin C to such a diet allows calcium to be rapidly deposited. Let us now consider the problem of hypercalcemic bone. In this case, it seems probable that we are confronted with retention of calcium and phosphorus with hypercalcification. Greenwald demonstrated this retention after parathyroidectomy in dogs. In the course of this study, it was noted that the animals were much more susceptible to viosterol or vitamin D calcification. After the parathyroidectomy, a dose of viosterol which ordinarily would not produce calcification in a normal animal in a given length of time may cause calcification of the organs of the parathyroidectomized animal. According to many observers, there appears to be a close relation between hypoparathyroidism and abnormal calcification such as occurs in Paget's disease, juvenile sclerosis, renal sclerosis, otosclerosis, etc. The association of a low serum calcium and low calcium excretion in otosclerosis has been frequently observed by otologists. The occurrence of cataracts in parathyroid tetany in human beings and in experimental animals has been noted by many observers. King and Page have reported in the April, 1929, number of *Biochemische Zeitschrift* that, in the case of phosphatase, overfeeding of irradiated ergosterol will cause a decrease in phosphatase content of bones and an increase of this salt in the blood serum. An excess of parathyroid hormone will cause a fall in the serum phosphorus and an excessive urinary excretion of phosphorus. It is also a well known

fact that, in thyrotoxicosis, bone atrophy will occur, owing only to the increased calcium and phosphorus metabolisms in this disease. In general, we may say that bone changes are dependent not on the amount of calcium and phosphorus in the body, but on the factors necessary to maintain a calcium-phosphorus balance. Other conditions exerting an influence in this mechanism are concerned in maintaining the proper acid-base balance. In volume 10, 1930, of the *Journal of Dental Research,* Jones cites Seeman's work. He concludes that the high incidence of rickets among the poorer classes is due to the excessive use of vegetables, which results in an insufficient formation of hydrochloric acid in the stomach, thus preventing the transformation of the insoluble calcium salts in the food into the soluble forms. Evidence both for and against this theory has been collected. Scheer found that children placed on an acid diet showed better absorption and greater retention of calcium and phosphorus than children put on an alkaline diet. Jones and Flood have reported that certain additions of hydrochloric acid to cow's milk formulas promoted calcification in rachitic children. Conversely, the addition of sodium bicarbonate to cow's milk formulas has been shown by Shohl and Sato to reduce the retention of calcium and phosphorus in infants. Another factor in maintaining calcium-phosphorus balance was recently reported by Read Ellsworth. By giving glucose and insulin to individuals free from any disorders of calcium, phosphorus or glucose metabolism, he was able to demonstrate rapid rise in blood calcium and rapid fall in blood phosphorus. It will be noted that I have confined my discussion to the influence of endocrine dietary and vitamin factors in bone changes through the regulation of the calcium-phosphorus balance. I have not discussed the hypertrophy and atrophy of soft tissue in the buccal cavity since the mechanism of such change is not definitely known. That there is a close relationship between soft tissue change in the buccal cavity and calcification of bone, there seems little doubt. The precipitation theory of calcification could be advanced; or, according to Shear and Kramer, the process may be that of the formation of intermediate calcium-protein compounds. These may be produced by the interchange between the cartilage protein and calcium and phosphorus of the body fluids. Dr. McKevitt's paper shows clearly some of the end-results of disturbed calcium and phosphorus metabolism. The foregoing comments may serve to indicate, to some degree, the relationship of these end-results to other factors in the regulation of body metabolism and growth.

Alfred Gysi, Zurich, Switzerland: Dr. McKevitt gives a clear description of the possible differences in the bony structure while the natural teeth are still present, and which structural conditions account for the, up to now, not well understood differences in the behavior of the alveolar process during and after extraction of the teeth. A knowledge of these types of bony structure is of the utmost importance for the exodontist or the prosthodontist if he intends to render to his patients the best service that is possible. This service is also an excellent means of protecting the exodontist and the prosthodontist against unforeseen unhappy results of his procedures, and the patients can be informed before the complete loss of the natural teeth what is to be expected from artificial teeth. Thus, the patient cannot blame an otherwise good and honest dentist for malpractice if the artificial teeth do not render an ideal service in function and in time, when the reasons for this deficiency lie not with the dentist but in the form and structural condition of the alveolar process. When all the teachings of Dr. McKevitt's presentation are practiced by the prosthodontists, dentistry will have made a decided step for the advancement of our science.

Dr. McKevitt: Endocrinology as a newer phase of modern medicine is destined to engage the attention of the dental profession as a serious study. The color tone index to hypercalcemic and hypocalcemic bone can be readily discerned in the roentgenograms in various publications. Modern x-ray equipment has all the devices for a standardized technic and should be so employed. Successful dental roentgenography depends on the knowledge of the operator and the type of apparatus used. The first is acquired by a perusal of the many available books of today dealing with differentiation between normal and pathologic areas; the second being a matter of modern equipment. The terminology used to describe the bone types hypercalcemic and hypocalcemic may be improved as Dr. Molt has suggested. As regards the

decalcified tuberosities, they may be pathologic or nonpathologic. Micro-organisms have been found, particularly where a devitalized tooth was in juxtaposition to this area. This is in accord with Dr. Molt's statement that "in a large proportion of these cases, no contiguous source of infection exists." A perusal of the report on edentulous areas by the Mayos in such cases as this may add to its significance.

CARE OF INVESTING AND SUPPORTING TISSUES IN THE PRESENCE OF CONSTITUTIONAL DISTURBANCES*

By IRWIN A. EPSTEIN, D.D.S., St. Paul, Minn.

THE object of this paper is to emphasize prudence in caring for the investing and supporting structures of the teeth in the presence of certain constitutional disturbances. It is well known that a large number of persons who come to the dental office are suffering from systemic ailments of various degrees of severity, and are ambulatory and apparently carrying out their usual duties, through either necessity or choice. Many of these patients are unaware of their condition, which not infrequently is made manifest to them by the cautious dentist during his diagnosis, or, as is more often the case, by difficulties which arise after dental treatment. With the growing enthusiasm of dentists for the various methods of surgical interference in the treatment of periodontal disturbance and with the surgical risk involved in operating indiscreetly in uncontrolled cases, the reasons for knowing more about the general physical condition of the patient become emphasized. Questions arise constantly as to what precautions should be taken in caring for the sick, and the cooperative effort demanded in the management of the conditions encountered affords one of the strongest bonds between the practice of medicine and the practice of dentistry.

The usual means of caring for the periodontal tissues, such as preliminary scaling, root curettage, polishing, medication, home care of the mouth, regulation of the diet, correction of occlusal discrepancies and the various methods of gingival resection, may be employed with due regard for the following conditions: 1. Ability to recognize pathologic conditions of the periodontium and a knowledge of recognized methods for their treatment. 2. Knowledge of the patient's condition, or medical diagnosis. The patient usually will give information concerning his health, if he is asked. 3. Judgment as to the best time to institute treatment. This is best determined by medical and dental consultation. 4. Determination as to how much should be done at one time. 5. Recognition of the restorative possibilities. This idea should not be lost sight of in planning periodontal treatment, because, as is well known, reconstruction can be carried out to a degree in a well person that would not be practical in the presence of certain constitutional disturbances. 6. Judgment as to whether to regard the pro-

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posed treatment as palliative or as curative, by eliminating a possible contributing factor to the systemic ailment or prophylactic for prevention. Commonly, these cases are the reflection of a systemic condition and will subside with general improvement, and treatment should be modified accordingly.

Since the dentist has not been trained adequately in the methods of making differential diagnosis as they are usually employed by physicians, he frequently fails to make the best use of the information that may be gained from subjective sensations (symptoms) and objective manifestations (signs). There are a large number of conditions which produce more or less characteristic alterations in the mouth, and these should not be overlooked. On the other hand, it is true that in the same diseases, in many cases, the mouth looks healthy even in the severest stages of the disease. In cases of gingivitis, stomatitis, angina, glossitis, *fetor ex ore,* salivation, lymphadenitis, disturbances in sensation, spontaneous hemorrhages, etc., systemic influences in addition to the local etiologic conditions must be considered. This fact also emphasizes the importance of making visual inspection of the mucosae, the tongue and tonsillar areas a routine part of mouth examination.

Let us consider a few types of cases which frequently present themselves to the practitioner of general dentistry for customary dental care.

Since one of the most phenomenal of biologic reactions is the maintenance of a practically constant animal body heat, variations of a single degree are of consequence. How often is the temperature taken in the dental office? Dental operations of a surgical nature should not be undertaken in the presence of fever unless it is reasonably well assured that the condition under consideration is the cause of it.

The appearance of certain lesions of the mucous membrane at the onset of digestive disturbances or shortly thereafter is fairly common, yet not often associated therewith. These changes may be found in persons who are undernourished because of rigid self-imposed diets, as well as in those who are malnourished for other reasons. These people will frequently come to the dentist with small sores on the margins of the tongue or on the alveolar gingivae near the reflection of the labial or buccal mucosae. Extreme dryness, due to mouth breathing, or increase in salivary secretion may be noted. The tongue may become beefy looking and deeply furrowed and the fissures become filled with a creamy purulent accumulation. Imprints of the teeth may be seen at the sides of the tongue. The odor of the breath is commonly foul. The mouth should be thoroughly cleansed and rigid hygiene maintained by the patient. Since one of the chief values of the various mouth lotions and washes is obviously that they are good perfumes, they are to be used frequently. Solutions of acetyl salicylic acid used as mouth rinses give some temporary relief from pain. Application of phenol, alcohol, tincture of aconite and tincture of iodin in succession on ulcerated areas brings quick relief from discomfort and tends to prevent extension of the lesion.

In scurvy, the tongue is commonly heavily coated. Hemorrhage from the gingivae may be one of the initial symptoms. The interdental papillae become markedly hypertrophic and loosen from their attachments. Correction of the diet leads to a rapid return toward health of the gingival tissues.

Pregnancy is frequently accompanied

by changes in the gingivae. It is not uncommon early in term for the gums to become painful and margins reddened and frequently swollen. Later in gestation, the teeth may become exceedingly loose. "Like dentition," states Block, "pregnancy in a healthy person is a physiological process but very often borders on the abnormal." Many women pass through the entire period without mouth symptoms of any kind. Root curettage may be performed, the precaution being not to tire the patient excessively. Gingival resections or flap operations may also be performed in selected cases, without untoward effects. Instruction in home care and diet are of importance, and, ordinarily, careful interdental brushing and the use of milk of magnesia quickly bring about a correction of the condition. The patients are advised to use the milk of magnesia after brushing. A tablespoon of it is flushed back and forth through the interdental spaces and the mouth is not to be rinsed after expelling the solution. It should be impressed on the patient that the excess is to be allowed to remain. The use of the flat waxed dental tape, to supplement the use of the brush, is especially valuable in the routine care of any mouth. Brushes carefully used accomplish a great deal; but in spite of careful instruction, many patients frequently revert to their previous style of brushing before the time for recall and fail to scour the teeth and massage the soft tissues adequately. An accumulation of soft material between the teeth is more easily removed with the tape than by the brush. Cotton wrapped toothpicks are effective, but the patients will not take the time to go through the procedure necessary to cleanse each interdental space with them, while they will use the tape.

The diabetic shows very little resistance to infection. This holds true for the alveolar process and gums as well as other tissues in the body. Deviations may be found in the periodontal tissues, varying from the normal or near normal to a very acute inflammatory reaction of the soft tissue, which may extensively involve the supporting bone as well. The mouth becomes dry and the breath may take on the odor of acetone. The gums may become definitely inflamed, swollen and painful and bleed profusely on the slightest provocation. Ulceration occasionally occurs. Gentle massage with napkins folded over the fingers and the use of astringent mouth washes aid somewhat in reducing local discomfort. As general treatment is instituted, the tissues tend to return to normal without assistance. As a hygienic measure, thorough mouth care should be instituted as soon as possible. Prophylaxis should be performed at frequent and regular intervals in order that free food and deposits may be removed thoroughly. As care should be taken not to injure the gums, rubber cups are preferred to rotary brushes.

The removal of infection about the teeth may be considered as assisting to raise the general resistance of the individual. Experience has shown that wounds in the mouth in diabetics heal slowly, particularly where the alveolar process has been exposed. Gangrenous tendencies must be avoided. Extensive root surface curettage and gingival resections are ill advised in the presence of sugar in the urine. The administration of insulin reduces the hazard almost to a minimum. When the urine is sugar free, surgical procedures may be carried out to a limited degree without ill effects. I have never seen necrosis under the cement dressings commonly used in surgical treatment of pyorrhea in these cases.

The value of medical cooperation cannot be overestimated.

Alterations in the gingivae can also be found in nephritis. The gums may become hypertrophied and loosen from their attachment. The teeth may loosen. Cases have been seen with albumin plus 4 in the urine without any sign of change in the gingival tissue. Here again, surgical measures should be instituted with caution and as much as possible delayed until after the urine is free of albumin. Because of the relationship which has been demonstrated between dental infection and nephritis, the elimination of all mouth infection is necessary. Not too much should be done at one time. An ulcerative gingivitis may be one of the first symptoms of uremia. Pain followed by reddening of the gums, with necrotic borders which bleed easily, and the peculiar urinous odor of the breath should be noted. In many instances, the patient seeks the services of the dentist first, and, after unsuccessful treatment or frequent remission of the mouth condition, is referred to a medical advisor. Those diseases in the so-called "rhematoid" group, i. e., neuritis, arthritis, myositis, etc., do not usually produce changes in the gingivae, although they may lower the general resistance so that the tissues are not able to overcome irritation from local conditions. Patients of this group frequently seek the services of a dentist before seeing a physician.

Infection about the teeth should be cleared up, the precaution being taken not to do too much at first nor to operate in the presence of a rise in temperature. The method of operation is, of course, determined by a consideration of the condition which presents itself. Many prefer surgical resection because of the lesser amount of time involved in thoroughly "cleaning up" a mouth. Unquestionably the relation between dental foci and systemic disturbances has been proved, but the overzealous enthusiast who does not consider all the possibilities of his contemplated procedures frequently unnecessarily mutilates the mouth.

Skin diseases show few associated lesions of the gingivae. Most of the mouth lesions are to be found on the mucosae of the palate, cheeks, tongue, etc., and hence will not be considered here. Patients under treatment with mercury often exhibit marked changes in the gums which clear up upon cessation of treatment. The suggestion of caution for protection of the operator has been emphasized in the paragraph of a paper written by Goodman: "It has been estimated that about 35 per cent of all the chancres of the finger have been found among dentists."

Tuberculosis occasionally affects the gums. The alterations found in the mouth are practically always secondary to tuberculosis in other parts of the body. Detection of tuberculous lesions in the mouth not infrequently precedes chest examination, the patient being entirely unaware of his condition. Ordinarily, there is no active acute inflammation and pain is rarely present. The lesion may be a mild gingivitis with the loss of the interdental papillae and the filling in of the spaces they had occupied by sordes. In occasional instances, the free margins of the gum will ulcerate, the condition resembling Vincent's infection. Pain is rarely present in tuberculosis, while other types of ulceration are usually accompanied by extreme tenderness. The bacteriologic examination of the sordes and exudate reveals nothing characteristic. The lesions of tuberculosis are found more often on the mucosae or tongue in the form of ugly ragged ulcers than on the gingivae.

Anything that affects the blood will affect the tissues and, conversely, conditions that affect the tissues will affect the blood. Extreme pallor, spontaneous hemorrhages or the presence of petechiae should suggest one of the blood dyscrasias. Of these, secondary anemia, the most common, is manifest by varying degrees of paleness of the gums and mucous membrane. Infection is among its most frequent causes, and I have been able to demonstrate, as have others, that dental infection may produce secondary anemia. Anemia is a reduction of the red blood cells and a corresponding reduction of the hemoglobin.

Ordinarily, no restrictions are placed on the type of work which may be done in these cases. Healing seems to go on undisturbed. The one precaution in severe cases is to avoid extreme loss of blood. A greater amount of oxygen is to be used in giving a general anesthetic in cases of anemia. No dentist should overlook the mouth symptoms in pernicious anemia. A persistently sore, smooth tongue and mucosae of a milky white color are the most common alterations. Dental infection does not produce pernicious anemia. That dental infection had been eliminated before the patient happened to have a remission does not mean that the procedure should be regarded as responsible for the improvement, since the disease is characterized by periodic remissions. The chiropractor may happen to treat the patient immediately before his next remission.

Removal of dental infection tends to raise the general resistance by eliminating one possible overload. If petechial hemorrhages are seen in the mucosae and gingivae, the patient should be questioned about any tendency to bleed and to become black and blue after minor bumps or bruises. In the presence of purpuric conditions, extensive scaling or gingival resection is particularly contraindicated. Hemorrhage from the gums without obvious and direct injury or spontaneous hemorrhage should point toward Vincent's infection, scurvy, uremia, purpura, agranulocytosis or leukemia. Many cases of leukemia begin with a gingival disturbance which resembles Vincent's infection. The gums become swollen and painful and ulcerate freely. The symptoms are similar and the smear reveals the same bacteria. Medical histories of these cases frequently reveal that the patient was first treated by a dentist for Vincent's infection. A blood examination is indicated in all cases of Vincent's infection which thorough, prolonged treatment does not clear up.

Care should be taken to note types of blood cells and their state of maturity when making these examinations. In hemophilia, there are no morphologic changes in the blood. Delayed clotting seems to be due to the quality of the blood platelets. The function of blood platelets is intimately bound up with the process of blood clotting. In purpuric conditions, the tendency to bleed seems to be associated with reduction in the number of platelets. When hemophilic platelets are mixed with normal blood cells, delay in clotting time results; when normal platelets are mixed with hemophilic blood cells, normal clotting results.

Usually, local measures are not effective in checking bleeding in the blood dyscrasias, and the cautery and caustics are particularly to be avoided. For symptomatic treatment, aromatic sodium perborate is found most helpful, as it tends to eliminate the partially clotted blood and sordes and is not especially irritating to the tissues. The following formula, which is not original with me, has been

found effective, and leaves the mouth with a cool fresh feeling: sodium perborate, 6 drams, oil cassia, oil peppermint, oil wintergreen to make 36 drams, saccharin, 12 gm.

I believe this to be one place where the dentists may cooperate to further the work of the Council on Dental Therapeutics. Cardiac and circulatory disturbances commonly produce no alterations in the tissues of the mouth. A general cyanotic appearance frequently may be found in cases of cardiac insufficiency. Taking the pulse, an easy thing to do, reveals much. Such features as irregularity, rate and intensity may be readily noted and persons with marked deviations are to be referred to the medical consultant. In case of altered blood pressure, it is well to reduce the amount of epinephrin in the local anesthetic and inject slowly. As a rule, if the patient is able to come to the office, most procedures may be carried out safely. In most cases, it is sufficient that care be taken not to do too much at one time, especially at first. Irregularity of the pulse should cease, as far as is practical, before an extensive program of periodontal treatment is carried out.

Metallic poisons, such as lead, bismuth and mercury, are well known sources of inflammatory changes in the gums. The blue line of metallic sulphid, which is deposited within the gum tissues, is characteristic of the condition. Serumal calculus may frequently, as seen through the translucent free gingivae, seem to resemble the gum in this condition. Ordinarily, there is little discomfort and few other signs in the gums. Work may progress without interference after the source of the metal has been eliminated. Blood examination will reveal certain changes (basophilic stippling) in the red blood cells which are practically diagnostic of the condition brought on by lead absorption.

In jaundice, there may not be any symptoms in the mouth except a yellowish tinge of the mucosae. A tendency to calcium deficiency means a marked operative risk. Premedication with calcium lactate for several days or with parathyroid extract tends to raise the blood calcium.

In lesions of the uveal tract, dental infection should be eliminated under the direction of the oculist.

CONCLUSION

Thoroughness in every step of the work necessitates accuracy in observation and requires intelligent interpretation of deviations from the norm. The more frequent use of laboratory examinations, as well as the taking of the temperature and pulse of patients who come to the dental offices is urged, so that untoward postoperative sequelae may be reduced in number, and that the dentist may better fulfil his obligation as a public health guardian.

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A PLEA FOR HEALTHIER ENVIRONMENTAL TISSUES IN BRIDGE AND PARTIAL DENTURE CONSTRUCTION*

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THE period in which we are living is one of change. Almost daily, we come face to face with our limitations, and are conscious of the outstanding fact that crown, bridge, and partial denture construction has been challenged during the past twenty-five years. The time is most opportune for us to take inventory of our past mistakes in fixed bridges and partial dentures. The investing tissues under and about them give conclusive evidence, microscopically and macroscopically, of pathologic processes, which obviously are destroying soft tissues and bone, and are followed by a great loss of teeth. Finally, through their years of toleration, they impoverish the blood stream, jeopardize resistance, and undoubtedly undermine rather than promote health.

Hippocrates said, "As the blood stream, so the man, just as weak and just as strong." Another well stated, "Blood is ourselves in solution."

Therefore, it is going to be my purpose to direct attention to the environmental tissues; and, if I succeed, changes are bound to ensue, especially, if due consideration is given dental foci of infection, and their untoward sequelae, and the correct functioning of abutments, bridges and partial dentures.

Here, we might well ask ourselves, Do we, as a profession, sufficiently appreciate the magnitude of our responsibilities? We must at all times be conscious of the fundamental reason for our existence as a profession and a significant part of the healing art, i.e., that our chief aim must of necessity be the conservation of health; and, obviously, the teeth and their environmental tissues play a fundamental part in health conservation.

We are, therefore, called on, in order to be masters of a given situation, to acquire a thorough knowledge of histology, physiology and pathology, and their application, especially those phases which are relative to the field in which we are working. Sir William Osler well stated, "There is not one single thing in preventive medicine that equals mouth hygiene and the preservation of the teeth." Charles H. Mayo, in Minneapolis, June 15, 1930, stated that 75 per cent of infectious diseases have their origin in the mouth; and recently William Hunter, of England, has said[1]:

> The degree of oral sepsis cannot be expressed in terms of "infected teeth," as some observers do. It must have regard to all the other conditions present—of septic gingivitis, tartar deposit, ulceration and pocketing, pyorrhea; of peridontitis and osteitis, shown by recession of gums or looseness of teeth, or by thickening of alveolar margins; number of carious or necrosed teeth; number of devitalized teeth (nerves destroyed); number of teeth with gold caps or porcelain crowns, gold bridges (a very potent form of sepsis, espe-

*Read before the Section on Partial Denture Prosthesis at the Seventy-Third Annual Session of the American Dental Association, Memphis, Tenn., Oct. 21, 1931.

1. Hunter, William: Am. Dent. Surgeon, 51:11 (Jan.) 1931.

cially in regard to its neurotoxic effects); and finally to conditions revealed by radiographs of apical abscesses and granulomata, of buried roots, of impacted or unerupted teeth. . . .

The amount of infection created by all these various conditions is far greater than anything ever found in connection with infected tonsils; and also far more virulent, since it is all in connection with bone tissue, which always enhances the virulence of a septic infection. . . .

It is in regard to these apical granulomata that most differences of opinion have arisen, some regarding them as quite friendly little changes—sort of quarantine stations—at the apex of the tooth, indicating the arrest of the infection; others regarding them as dangerous foci of infection, which, however quiescent, they may appear, are nevertheless infective, and a possible source of toxemic effects, and possibly even of conveying metastatic infections elsewhere. . . .

So with these apical granulomata and apical abscesses, their infective nature is undoubted, and the best way to deal with them is to remove, rather than allow them to lie as potential sources both of present or future infection.

From these timely quotations and my personal experience, I am convinced that we are called on to raise the standards of our inlay, crown, bridge and partial denture construction, making it conform in every degree to the upbuilding of positive, not negative, health for our patients.

"Negative health" is a term descriptive of all health of the past, up to a quarter of a century ago. It is the term properly applied to the conception of health held by the great majority of the public and by many members of the medical and dental professions of today. It accepts disease as the inevitable lot of the human being. It regards the cure of disease as the means of health preservation, the maintenance of health. It takes no account of the fact that recovery from disease, like the repair work of a machine shop, is a measure of restoration to greater or less usefulness, but that damage or disease may be incurred by wearing bridges and partial dentures, leaving a degree of impairment in its wake which each new attack exaggerates, the organs becoming more open to attack and to final degenerative changes. The cure or relief of disease is the main business in which the average physician or dentist is engaged.

Positive health is the condition of the *well* human being, who from birth up is protected from the occurrence of disease; who is so fed that his best growth and development are promoted; who is shielded from the occurrence of accidents; who is afforded the best possible environment in the home, the school and the community; who is, as far as science has given the opportunity, encouraged in the building up of his natural immunity against disease; who is aided by such means of fostering his acquired immunity as vaccination against smallpox and inoculation against diphtheria or scarlet fever; who is housed in a sanitary home, where he is protected against food or water pollution, where he is given the benefit of proper waste disposal, an adequate supply of fresh air, fresh water and pasteurized milk, and where he has contact with those people who are free from communicable disease. The result of such a positive health system as this is progressive betterment. It is health of the whole child, physical, mental, moral, emotional and spiritual, in the highest sense of those terms. It is health in all the relationships of life.

The stepping stones to such an ideal condition are research, knowledge, teaching and application. Therefore, education with freedom for such research and teaching is the chief need of the world and of our profession. There is a lack of scientific research on the foregoing subjects; and we, individually and collectively, should lend and spend our-

selves to further such a greatly needed and valuable contribution. In other words, we must consider more seriously the investing tissues of all teeth and the devitalized tooth which is negative in the roentgenogram.

Almost without exception, these teeth have been regarded as harmless and allowed to remain, in the belief that they were free from infection. We are just beginning to find out that the pulpless, roentgen-ray negative tooth may be a worse offender than the tooth that shows rarefaction. This fact, and the recent discovery in edentulous jaws of the symptomless residual abscess containing streptococci with which the patient's condition may be reproduced in animals—a fact also not even thought of in the past—call for restudy of the whole question before final conclusions can be drawn.

Our conception of focal infection should not be too mechanical. Bacteria are very small, and if invasive powers are high, they may gain entrance through relatively normal mucous membrane or slight collections of lymphoid tissue. In order that an infection from septic foci may become established in remote body tissue, the same forces of resistance which afford protection against microbic invasion from other sources must be overcome. A focus of infection wherever found, even though in the intestinal or genito-urinary tracts, and which for mechanical reasons can neither heal nor drain, teeming with microorganisms, should be regarded as a test tube with permeable walls embedded in the tissues, where absorption channels for bacteria and their products are afforded. In consequence, the play between the living bacteria and their products, and the protective mechanism of the host, becomes forced. A certain degree of immunity no doubt results, but since the streptococci usually present are poor *antigens*, the immunity induced is transient; and, since a state of increased susceptibility or hyper-sensitiveness from over-stimulation may supervene, the protection may be inadequate. The place of localization of bacteria, aside from the influence of a lowered resistance, local or general, and from that of injury, fatigue, strain, improper food, bad hygiene, disease, heredity, and so forth, depends largely on the peculiar infective capacity, or the peculiar poison-producing power of the bacteria in question.

Devitalization of teeth, as practiced in the past, has been proved to be a dangerous procedure and should cease. Suitable restorations have been devised which no longer make this necessary. Simple extraction of infected teeth is not sufficient to insure freedom from infection in the jaw, particularly of the tooth that has become infected after artificial devitalization. Filling in of bone as revealed by roentgenograms, following root-end amputations or the antiseptic treatment through root canals still in vogue, does not necessarily mean that infected areas around teeth have become sterile. Just how often, and in what particular case, clinically measurable benefits will result from removal of dental or other foci of infection after they are once established, remains for the future to decide. A careful study of the clinical and experimental data now available shows that a sane and comprehensive effort toward the prevention and cure of septic foci in dental and other areas is a sanitary measure of first rank that should result in the alleviation of suffering, better preservation of the tissues in old age, longer average duration of life, increased mental and physical efficiency and the prevention and cure of acute and chronic systemic disease, and, through the laws of heredity make for a sturdier race. In the prevention and eradication of focal infection in the dental areas, the dental profession may be depended on to render its large share of service in the preventive medicine of the future.

"Temporizing with infected teeth is, in my opinion, distinctly culpable." (Molt.) On the basis of my experience and from my belief in the foregoing statements, taken from an article by N. William Blum,[2] of Chicago, I am desirous to call again to your attention, for our mutual benefit, what I consider to be the "weakest link" in our consideration and application of crown, bridge and partial denture construction, the devitalized tooth. If it is not eliminated, what are the results, in our fixed, movable-removable bridges and partial dentures?

2. Blum, N. W.: Am. Dent. Surgeon, 43:575 (Dec.) 1928.

C. N. Johnson has well stated, "In the heavens of the future hangs the rainbow of promise . . . prevention"; the god before whom all of us should bow.

Dentistry has by no means reached such a level of excellence, and certainly is not so uniformly efficient, that we can with assurance look for the millennium.

Defects hinder — find and eliminate them. Crowns, bridges and partial denture prosthesis is rapidly being brought by science from the darkness of empiricism into the light. Time does not change truth, because truth, of which we are all searchers, is timeless.

It might well be said of our profession that "every man did that which was right in his own eyes." We may not need a "gloomy dean" to overemphasize or overstress certain perils that loom on the horizon. It requires only a little serious reflection, a modicum of common sense, a brief perusal of our mistakes, to make clear to us the supreme significance of the fact that the devitalized tooth is a stranger that sojourns among us.

The tardiness in the development of crown, bridge and partial denture construction may be traced, no doubt, to the very great complexity of the subject. Yet, be that as it may, the condition is now being rapidly remedied, and to those of us who are a little older, it is most gratifying to see the younger men attack their subjects so earnestly and, let me add, with such evidence of a genuinely scientific spirit.

The belief holds among the profession that "honest dentistry" must alleviate human ills; but, to date, it is not perfected. Therefore, some one must take the risk of attempting perfection. As Roosevelt wisely stated, "Every man owes some of his time to the upbuilding of his profession."

There is now urgent and insistent outcry against ill-fitting inlays, crowns and bridges. Knowledge without practical application is like a bow without a string. The ideal of perfection is followed only as far as happens to be convenient, and the most piteous appeals of earnest and scientific workers to the professional conscience awaken but a languid response.

Moreover, genius itself must be trained and developed before it can find expression. Fate seems to take a hand at this point also, and to decree that those who are to stand highest in their chosen fields must pass through the severest discipline of circumstance before their gifts come to flower and fruitage. They come up out of great tribulation, through struggle, privation, and hardship, before they attain the maturity of their powers.

Of such geniuses, with skill, ability and purposeful intent we have many, as, for example (1) the man who designed, perfected and taught the use of the 18 and 20 gage wire clasp for partial dentures, and who was, too, an ardent worker for the conservation of vital tooth structure; (2) the man who perfected the precision or frictional attachment and who is father of the phrase, "form, function and nutrition"; (3) the editor and philosopher who wrote many articles on the value of correct tooth anatomy, with effective and efficient carvings for inlays and crowns, and (4) the man who taught us so much relative to taking compound impressions under equalized biting stress, coupled with muscle trimming, and the sectional impressions for partial dentures. From such earnest, purposeful and invincible workers, we realize

The heights by great men, reached and kept,
Were not attained by sudden flight;
But they, while their companions slept,
Were toiling upward in the night.

The ultimate aim of crown and bridge

workers must, of necessity, become a valuable asset — not a liability — to the health and life of the individual, for whom the appliance is designed and constructed and by whom it is worn. The opportunity for health is one that none of us can afford to miss.

Andrew Carnegie said, "It marks a big step in a man's development when he realizes that other men may be called in to do a better job than he can do himself." Such facts, when realized, are the tools with which we carve our destinies; and the determination to surpass usually brings leadership, and it also takes greatness to sustain this waiting demand. With such increased responsibilities, we must be prepared for increased difficulties.

Some dentists are a partial success; others, a decided success. It is left to the individual as to what he will be; for, naturally, mankind pays tribute to genius wherever it is found.

Every man has a right to be judged by his best; it is not the number of his failures, but the value of his successes which affords a just gage of his genius. In almost every man's life, but usually for a very short time, ambition is the dominating impulse. But habit and lack of will power soon make the majority of us settle back, more or less contented, into the herd, to become an "eternal average" and to stay there until the end.

To know that you have succeeded in a task undertaken, to know that you have, at least, done your best—the best that you possibly could have done—that is what makes life and your profession worth while. In other words, each of us must build a life. Our life's service must be brought into consonance and harmony with lip service, of which patience is the foundation of greatness, taking the individual from the herd and placing him on high, where men see, admire and envy him, and where, with few exceptions and perhaps none, the man of solitude and achievement is lonely and sorrowful. Many dentists promise much and deliver nothing.

We, as dentists, and part of a noble profession, are obliged and called on to keep in step with the procession, knowing that many phases of our work have been challenged, and keenly conscious of the fact that science goes ahead, education spreads and men, women and children are taught to think, where once they believed. And the world is steadily growing better.

Therefore, the most laudable service that our profession can render is the attempt to benefit and guard the health of our patients, which signifies, in its conclusion, that, in our efforts to repair the ravages of caries, replace missing teeth and maintain the health of investing tissues, we must be extremely cautious not to jeopardize the vitality of these teeth or tissues to an extent whereby the body as a whole might be endangered.

I am confident that we fully realize that much of the dentistry in the past stands indecisive at the crossroads; a new epoch is in the making. Deep in your own consciousness, none of you present here will attribute to our profession any too large a measure of success in dealing with the prevention of the breaking down of the dental tissues of our patients.

To quote from Herman Chayes:

> Just how successful we shall be depends, to my mind, on our willingness to admit, first, our ignorance of the problem, as well as our willingness to unlearn most of the things we have practiced, and give ourselves entirely up to the realization that the teeth and environmental tissues are subject to certain definite, immutable laws of life, development and

growth, laws which must not be interfered with by any mechanism or appliance we may at any time insert in the human mouth. Physical life is an expression made up of the trinity of Form, Function, and Nutrition. It can only be maintained in perfection by a balance of the three things named. Any of these three being impeded to any degree, the life expression falters, reduces, and finally disappears entirely. A correct dental operation may be defined as one, the result of which is conducive to the health of the individual upon whom the operation is performed. We understand "health" as the maintenance of the vital balance which is expressed by the normal functioning of all organs which compose the human body.

Dental ideals, ethics, economics, conceptions of education, panel dentistry, status of dental mechanics; the recent challenges relative to the use of hard dental alloys, golds that do not wear with the natural teeth; keener consideration for the undernourished mucosa and bone under fixed bridges and heavy clasped partial dentures; the maintenance of health in the investing tissues of all teeth supporting crowns, bridges and partial dentures; the value of a balanced diet in the prevention of all dental diseases; the fact as to whether the initial cause of caries has its origin from within or without the teeth, and, last, a most careful study and application of the conditions that govern and are responsible for prevention are all fluxing into the melting pot and ready for remolding.

THE FUNCTION OF ABUTMENTS

The abutments, or natural teeth, which act as supports for the bridge, must simply serve to prevent the vertical displacement of it during mastication, and they must so interplay with the bridge that they (the abutments) will be effectually kept from migrating into fields other than their own. Outside of these two requirements, nothing more should be expected of them.

Any completed abutment must be so made that it will restore to the mouth a dental organ capable of exercising all natural functions. The bridge itself must, during mastication, gently, and to a limted extent, ride upon the alveolar ridge covered with the mucosa and be so constructed as to supply the intermittent stimulating interferences essential for the enhancement of fresh nutriment by virtue of the increased pressure-induced circulation of the end tissues.

Artificial restorations in the form of bridgework must be constructed so that they will not interfere with the maintenance of the hygienic balance essential to proper sanitation.

After twenty-five years of conscientious and purposeful endeavor in the replacing of missing teeth, I am convinced that the movable-removable type of bridges, with precision or frictional attachments, comes nearest to fulfilling the foregoing requirements, maintaining correct balance, sanitation and health to the environmental tissues, which is our ultimate aim, provided such attachments may be used without jeopardizing the vitality of the abutment teeth.

Since our study, teaching and research up to the present time have been unable, through preventive measures, to check caries and prevent pulps from dying, it undoubtedly is obvious and still imperative that we, as a profession, continue our efforts to perfect our mechanical technic; for we are called on to deal with existing conditions, i.e., the ravages of decay, various types of restorations and the replacement of missing teeth.

Closely related to our subject is a consideration of the principles governing crown and bridge work. Ever since the exigencies of accident or disease have caused the loss of teeth, the individual suffering from this loss has endeavored to supply, or to have supplied for him, the missing members. Undoubtedly, a greater amount of ingenuity has been expended in bringing restorative dentistry to its high attainments than has been called forth in any other branch of

our calling. Nevertheless, the replacement of missing teeth by means of bridgework of any type is always a problem of serious portent and one still far from its solution. This is true obviously because the remaining teeth, environmental tissues, or both, must of necessity assume the burden of restoring the function of the missing unit, or units, and that this responsibility must be assumed in addition to the requirements incidental to their normal activities.

Dr. Ash, of New York, has well said:

> There is but little variation from case to case in the ability of the alveolar ridge to support occlusal stress, transmitted through a restoration, except the tendency to gradual settling. But there is wide variation in the ability of abutment teeth to support, or even to retain either removable bridges or partial dentures. Briefly stated, the principal factors which govern the ability of abutment teeth to perform the duties which we may wish to assign to them are the load, the length of roots, and extent of their alveolar support, and the degree of tipping, if any, of the root from its normal position.
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> By the term "load," we mean the amount and direction of stress which the abutment teeth will be called upon to support. This varies with the shape of the ridge and the density of the mucosa and also with the extent of the appliance. It goes without saying that the longer the root, the greater the ability of the tooth to support stress, that is, if the surrounding bone is healthy,
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> Therefore, it will be seen that the condition of underlying tissues is the all-important consideration in fixed and removable bridges. In many cases the bite must be opened, with due consideration given the balancing of the occlusion, the spherical theory, and Gysi's Gothic Arch and tracings carried to a successful conclusion in the construction of our crowns, bridges, and removable dentures.

No mention is here made of periapical infection, as it is assumed that any infection found will be cleared up by treatment, or the tooth extracted. Personally, however, I am with Dr. Rosenow of Rochester,—"Why let sleeping dogs lie, especially under bridges?"

It has been my experience that we cannot promise immunity to any patient with restorations or pulpless teeth longer than twenty-four hours.

Since the health of our patients is the fundamental and first consideration, I am of the opinion that the removal of all foci of infection is of paramount importance. Thereafter, the investing tissues of all remaining teeth must be placed in a state of health. This gives the dentist a fearful responsibility. What is left after the removal of all possible foci of infection becomes sacred ground. The proper treatment of remaining teeth is of vital moment to the patient, involving not only his oral but also his general health.

Fixed bridgework has suffered from empiric methods applied indiscriminately by many of the members of our profession. Possibly, injury to the supporting natural teeth and the requirements of hygiene and sanitation have been largely ignored. The conservation, promotion and maintenance of health, the fundamentals in the replacement of missing teeth by any method, have been largely ignored, because we have failed to give adequate consideration and value to "form, function, and nutrition."

Faulty occlusion plays a most important part in the exfoliation of either a tooth or its abutment teeth. Stress in a direction and of a degree which the tooth is by nature wholly unprepared to meet is the hardest condition to deal with in either fixed or removable appliances.

If we could construct restorations so that the teeth would not be moved in function, the intention of Nature would be more nearly fulfilled. I have no pet theory of articulation and occlusion to promulgate, nor is this paper intended to be an exposition of any panacea for our troubles; but so important is the

proper relation of the maxillary and mandibular teeth to each other that I feel justified in saying that the future of dentistry in all its branches depends on the solution and understanding of this serious problem by the rank and file. Thanks are due the many earnest and untiring workers in this field of endeavor.

After experiences extending over a period of twenty-five years, I have found it safer to establish cusp relation in harmony with the condyloid path present in the individual case, rather than to establish a new occlusion arbitrarily. Let us not forget that "function determines development and structure," and food and function equal force and form.

First, we recognize the necessity for analyzing the conditions found in the mouths of those requiring bridgework. These include the stability and number of possible abutment teeth and the character of the soft tissues and alveolar ridge, centric occlusion and, most important, functional occlusion. From the diagnosis thus made, we can arrive at a decision as to the type of restoration to be employed. The stability of an abutment means virtually its ability to support, or retain, a fixed or removable restoration. Governing this are the load, the length of the roots, the extent of their alveolar support, the degree of tipping, if any, of the root from its normal position and the age and general health of the patient. Every replacement must be of one of the following three types: (1) tissue bearing; (2) tooth bearing, and (3) composite, i.e., both tooth and tissue bearing.

To come down to the present time, it is a question of considering the opportunities of the present generation, embracing both modern knowledge and the experience of those who have gone before, and also of considering the number of those who are doing the work now as compared with the number who did it in the past, whether we have any cause to flatter ourselves on the progress we have made—whether, taken as a whole, the work of the present is much of an improvement over that of a quarter of a century ago. Certainly, a large percentage of the work done at present is no whit better, and much of it is worse, than that done twenty-five years ago, and it does far more harm than good. At the present time, the profession is confronted with the burning question, "Is dentistry, for the average patient wearing crowns, fixed or removable bridges and partial dentures, a liability or an asset, in terms of health service?"

It has been well stated that a tooth must breathe. Dentinal fibrils must not be impinged upon by abutments driven to their destination, because of the shrinking of castings or expanding of tooth walls, from the same cause, later resulting in fracture of cusps. We are rapidly learning that large restorations on vital teeth tend to negative health—not positive health—and, in many cases, are a decided menace instead of a benefit. They are far from ideal and do not serve the patient healthfully, which was and always should be our ultimate purpose in reconstruction.

There is now the realization that no one person can in a lifetime solve dental problems regarding and produce a device for replacing all types of lost teeth. Nevertheless, we must constantly keep in mind (1) form, (2) function and (3) nutrition.

Because a bridge is no better than the abutments which support it, it becomes imperative that each casting, whether crown, three-quarter veneer or inlay, shall fit properly; in other words, so well

that no cement is visible after setting, especially at the gingival margin, and without expanding the tooth walls or impinging too hard on the exposed dentin. If possible, let us use an alloy that will wear with the natural teeth. To accomplish this, castings must duplicate the wax patterns at the time that they are made; and here begins the control of the important variables that in the past have jeopardized the casting process.

In other words, every abutment for fixed or removable bridgework, or those in partial denture construction, must be made as nearly perfect as is humanly possible, relative to fit, strength, margins, anatomy, contact and occlusion, after which we are ready for excellent and accurate impressions, poured with the abutments in position with a good soldering investment, and its opponent with artificial stone or low fusing metal, which will not permit its cusps to be worn away during construction of pontics.

In movable-removable bridgework or partial dentures, the abutments should be poured in metal or the original dies upon which these individual abutments were made be placed in position before pouring the impression, in order that they may be removed and replaced with accuracy, which is possible if Dr. Meyer's indirect technic is applied in the construction of the abutments.

We must not be unmindful, during the construction of abutments and pontics for fixed or removable bridgework, that we must secure (1) centric occlusion; (2) excursions of the teeth and mandible, and (3) functional occlusion, which was defined first, to my knowledge, by Dr. Ottolengui at the Cleveland meeting, in 1924, as follows: "Functional occlusion implies such arrangement of the teeth as would supply the highest efficiency during all the excursions of the mandible which are essential to the function of mastication."

Therefore, we are called on to incorporate into each abutment and in all replacements the various excursions of the teeth and movements of the mandible, having them in balanced harmony during centric and, especially, functional occlusion. Otherwise, as in the past, we shall experience many failures owing to a breaking down of environmental tissues and loosening and loss of teeth.

The success or failure of crowns and bridges undoubtedly may be recognized by the condition of their environmental tissues. Visions are no longer regarded as vague unrealities or idle day dreams. When linked with research, they represent potential progress. From time immemorial, dreams have influenced the destinies of the world. Men of vision direct their eyes to the future, rather than back along the years to triumphs of the past. Visions become realities through research. No sincere effort to find the truth ever leaves a man so ignorant as it found him, and no sincere effort to improve one's work ever fails to improve one's character. Let not the adage be forgotten: "Men who try to do something and fail are infinitely better than those who try to do nothing and succeed."

We undoubtedly are conscious that the greatest percentage of patients wearing bridges and partial dentures cannot boast of healthy investing tissues. Therefore, the challenge is constructive. It is useless to stop now to fix the blame; what is needed is tranquillity, moderation and constructive action. No other program can benefit the people. The country needs action and action without factious opposition. A quiet, candid conference in every state, disinterestedly

seeking the public welfare and health, would be worth more than pages of rhetoric. The processes and considerations producing healthy investing tissues are indispensable to the progress of dentistry.

You will agree that, "There are three great hungers of the human soul: the hunger for knowledge, for goodness and for beauty." Closely identified with the first hunger, for knowledge, is the third hunger, for beauty. Why not take a new adventure in beauty and eliminate the hideous display of gold so prevalent, so conspicuous, and so masterfully produced by the present-day casting process in the practice of 90 per cent of our profession? I take the liberty of calling this to your attention as a suggestion bearing on the first fundamental requisite for inlay, three-fourths veneer, and full-crown preparations. I am of the opinion that we are all fully aware of the outstanding fact that this prevalent and hideous display of gold can in a large measure be eliminated by exercising more careful consideration at the time we are making our preparations.

The particular reasons for the selection of my subject, and which stimulated and quickened my impulses, are twofold:

1. The dental profession is not functioning to its fullest capacity relative to the removal of dental foci of infection, and is therefore not lending its best efforts to preventive medicine.

2. A great percentage of bridges and partial dentures placed in the mouths of patients are a liability, not an asset, thereby adding to negative, not positive, health.

RÉSUMÉ

The dental profession must, of necessity, assume a much keener responsibility relative to the elimination of devitalized teeth and foci of infection, especially residual areas, where infected teeth have been removed, in order that such teeth and tissues will not add to negative but to positive health, thereby giving the patients seeking crowns, bridges and partial dentures a healthy foundation and environmental tissues.

Unless such foci are definitely removed, we are establishing what I consider the weakest link in the replacement of missing teeth. We are not properly discriminating between negative and positive health, and therefore not functioning to our fullest capacity. Simple extraction of infected teeth and filling in of bone, as revealed by roentgenograms, following root amputation, or the antiseptic treatment through root canals still in vogue, does not necessarily mean that infected areas around teeth have become sterile. Temporizing with infected teeth is, in my opinion, distinctly culpable. Dental infections have a danger usually in proportion to the quality of the soil of the host.

In the prevention and eradication of focal infection in dental areas, the dental profession may be depended on to render its large share of service in the preventive medicine of the future.

The greatest percentage of our fixed bridges and partial dentures with clasps are constructed on theoretical principles, with a decided lack of scientific application. Therefore, such mechanisms and appliances are not conducive to mouth sanitation and healthful environmental tissues. They are not a true expression of "form, function and nutrition," and are therefore being challenged. In the replacement of missing teeth, we must ever be conscious of the outstanding facts that "function determines structure" and that "food and function equals force and form."

As guardians of the portal of entrance,

we must appreciate that "knowledge without application" has little value, and is like a bow without a string. The ability of an individual is measured by his capacity to do things alone, without supervision. This does not give us permission to hear the music and miss the tune.

Mankind pays tribute to genius wherever it is found.

If we "build a box, let it be a good box," and whenever we build a bridge or partial denture, it should prove to be an asset and not a liability.

Opportunity for health is one none of us can afford to miss.

In replacing missing teeth, our life's service must be brought into consonance and harmony with lip service.

"Physical life is an expression made up of form, function and nutrition. It can only be maintained in perfection by a balance of the three things named. Any of these three being impeded to any degree, the life expression falters, reduces, and finally disappears entirely."

In the replacing of missing teeth, I believe the movable-removable bridges and partial dentures with precision attachments come nearest to fulfilling the foregoing requirements, maintaining correct balance, sanitation and health of environmental tissues, provided such attachments may be employed without jeopardizing the vitality and health of the abutment teeth. If clasps are employed, the abutment teeth would be safer if made of small, wrought, not cast, clasps so weak they will yield, bend or break as stresses demand.

The vulgar and hideous display of gold in the mouths of our patients is being challenged and severely criticized. Therefore, we should lend and spend ourselves for more esthetic restorations; and our life will take on a new depth of meaning in a fresh appreciation of the holiness of beauty.

The processes and considerations producing healthy investing tissues are indispensable to the progress of dentistry, and "duty done is the soul's fireside." In the successful fulfilment and conclusion of such a health service, we might well say, with Dr. Butler of Columbia, "If you open me up you will find inscribed upon my heart the word 'service.'"

So we repeat the challenge to the profession. We cannot wait for finished theories, for perfected solutions. Our resources of wisdom, of courage and resolution will be no greater tomorrow than they are today.

Thought is a social product, and the more the average dentist studies and thinks about these matters, the sooner will our leaders reach an intelligent conclusion and solution. The final adjustments will not be achieved in a day or a year. The wisdom of no single dentist is sufficient to make the adjustment. As never before, the welfare of mankind, dentally, rests on the intelligence and unselfish purpose of our profession. The common sense, the moral will, of the profession must be devoted to the preservation of civilization, which may mean its transformation. The challenge is to the deepest there is in us. A truce to cowardice, to selfish indolence, to ignorant prejudice, to idle drifting along the lines of tradition and blind precedent. Let us not argue from sentiment.

Michelangelo stood for a long hour before the statue of Donatello's St. George (one of the noblest examples of Italian sculpture), his heart kindling at the genius of his great predecessor. Suddenly he straightened, squared his shoulders, lifted his head, and said, *"Now, march!"* May we not profit by this quotation and his example?

DISCUSSION

C. W. Hoffer, Nashville, Tenn.: The success or failure of the work of reconstruction depends on whether the health of these tissues is established and maintained. We must agree with Dr. Maves that our work and the environment of our patients are continually changing, sometimes for the better, and sometimes for the worse. He also speaks of what we may expect to find under reconstructive work that has been done in the past. A goodly portion of our present work would meet the same condemnation. Teeth and their surrounding tissues play a very important part in health conservation. We must know the tissues and be able to differentiate between disease and health to be successful in this branch especially. A knowledge of the many diseases traceable directly or indirectly to infected teeth and their adjacent tissues should make us more alert in observing and correcting this or, would it not be better to say, in preventing these conditions. A few words about the pulpless tooth. If possible, we should not do reconstructive work on it. There are, I dare say, a few instances in which we may disturb the health balance of the patient more by removing pulpless teeth that show no disease clinically and systematically than by retaining them. If these teeth are removed, we often greatly impair and weaken the masticatory unit beyond rebuilding. With careful watching, these teeth may remain in service for years with much less injury to the patient's health than an impaired masticatory function would involve. Health first should be our goal in every case that comes under our observation and care. We should always seek to establish and maintain the resistance of the tissues to disease, and, where this has been lowered, use all science known to find the cause. We must agree as to residual areas of infection. So often, the tooth is removed, and little or no attention is paid to those infected areas. I believe that it is very bad practice to leave pulpless or infected teeth in patients manifesting systemic symptoms. Teeth infected with periclasia and in which health cannot be reestablished and maintained should never be retained in the mouth whether the patient shows clinical evidence of infection or not. Let us learn together what those "higher up" have done; and if by chance, or toil, we work out something, let us make it known in order that we may help humanity and perhaps improve our own idea. Let us each day prepare ourselves to render better services tomorrow. Let us (1) restore the environmental tissue to health; (2) restore all mouths as nearly as possible to their individual, normal function; (3) reestablish or increase vertical dimension when necessary to free the occlusion; (4) prevent leverages or undue strain, beware of cusp interference in all cases where alveolar support has been lost to any noticeable degree, and minimize the buccal and lingual diameter of the crown and dummies in crown and bridge work. If the span is very long, the tissue bearing, plus tooth bearing, is preferable, and always the intermittent pressure or stimulating type. For this type of construction, the Chayes type of attachments in most cases is preferable to the clasp, as it allows movement without wear of the abutment teeth, with not nearly so much strain on them. We must reproduce tooth structure, smooth sealed margins and never carry these margins below the gingiva unless it is absolutely necessary for strength, or to overcome the ravages of decay. Health of the soft tissues is easier maintained in contact with cementum than with any filling material. This will leave many of our failures open for observation, where they can be overcome, rather than hidden in the depths of the soft tissues and a menace to health of these tissues. We must think of the mouth and teeth as a unit, and do our best to make every member of that unit carry its share of the load. In doing this, we establish occlusal balance, and we assist Nature in maintaining the health of the surrounding tissues and throughout the body with proper care through stimulating brushing, prophylaxis, attention to diet and continued frequent and careful observation. How much better off our patients would be if instead of an elaborate display of reconstructive work, they presented a perfect set of natural teeth with surrounding tissues in a healthy condition.

A PRACTICAL DISCUSSION OF NITROUS OXID ANESTHESIA*

By H. B. CLARK, D.D.S., St. Paul, Minn.

FROM the beginning of its use as an anesthetic, and until quite recently, nitrous oxid was very generally regarded as the dentist's anesthetic. It was for many years used almost entirely by the dental profession for brief and hastily performed operations. During this period, dental operations were often begun before patients were completely anesthetized, and continued after they were conscious of pain. Often operations were crudely done, and many were not completed.

Such anesthesia was considered to be of little or no use in surgical work, but this anesthetic was given in dental cases to all kinds of patients, in all kinds of conditions, with almost no fatalities. Cocain was about the only local anesthetic in general use; but it was soon found to be exceedingly dangerous for certain people. Shortly after surgeons began adding oxygen to nitrous oxid, and found that "prolonged" anesthesia could be maintained with this combination, dentists began to improve and use nasal inhalers. They found that by using the inhalers and oxygen, they too could maintain satisfactory anesthesia for operations in the mouth, and they were able to do more careful and complete operations.

Simultaneously, procain and the greatly improved methods of its administration were introduced. Had this not occurred, it is probable that nitrous oxid would still be universally used by dentists as their chief ally when anesthesia was required.

Every modern hospital now has its gas machine, and surgeons probably use as much nitrous oxid as or more than dentists do.

Patients are thus acquiring more confidence in gas anesthesia, are more willing to submit to its administration and are less fearful that operations will be performed during partial anesthesia. The range of operations that dentists can perform satisfactorily under gas anesthesia is increasing. Still there is a difference of opinion among dentists as to whether it is expedient to employ it in their practices, and dental schools generally are not making a serious attempt to render graduates proficient in its use.

It is not desired to incite a discussion of the relative merits of nitrous oxid anesthesia and local anesthesia. Sometimes, one method is positively indicated, sometimes, the other, but nitrous oxid in dental practice is of unquestioned utility.

The idea of submitting to operations under local anesthesia is distasteful, even terrifying, to many. For those who will not submit to necessary dental operations under local anesthesia, but who will submit to them under nitrous oxid anesthesia, the latter is indicated; assuming, of course, that such patients are suitable an-

*Read before the Section on Oral Surgery, Exodontia and Anesthesia at the Seventy-Third Annual Session of the American Dental Association, Memphis, Tenn., Oct. 21, 1931.

esthetic risks, and that such operations can be done better than, or at least as well as, with some other form of anesthesia.

At times, and for such cases as good judgment based upon experience dictates, teeth causing pain, inconvenience and loss of time can be removed and other like conditions relieved promptly by the use of nitrous oxid, when without it it might be necessary to delay operation for several uncomfortable days; or such cases may subside and then go on to the chronic stage, with the evil consequences that we are so familiar with.

This is particularly true with children needing infectious deciduous roots or first permanent molars removed. They often will not submit to these operations under local anesthesia. Failure here to use gas, when it is indicated, may cause many of these patients to harbor serious infections, to the detriment of health, whereas, were nitrous oxid skilfully employed, the case might be readily cleared up and relieved of dangerous infection.

It has been oft reiterated in textbooks that nitrous oxid is the safest of all anesthetics. It is generally believed that the percentage of deaths occurring during its administration is negligible.

These assertions and percentages are based upon different methods of administration, and different types of operations, than are in vogue at the present time.

If nitrous oxid is to continue to maintain its enviable reputation for safety, we who use it should, if we have not already done so, begin to use greater care in deciding who may be anesthetized with it, and how much operating we shall do under it.

The nature of the long operations which we perform under gas, interfering as they do with normal respiratory exchange, with the normal supply of oxygen to the tissues and with the carbon dioxid content, peculiarly dispose patients toward fatigue and exhaustion, or, in other words, surgical shock.

It is improbable that any normal person can be killed by gas properly administered, and removal of his teeth, even all of them, but deaths are occurring in dental chairs, and following long drawn out exodontia operations by a few days, when these long operations are unwittingly done for people who are not physically able to tolerate them. Unless prolonged anesthesia is conducted with exceptional skill, and long operations are exceptionally skilfully done, grave dangers may be encountered in certain cases.

We speak of "reported deaths." Where are such deaths reported? They do not invariably become matters of general information. We hear of only a few that do occur, and of most of them by word of mouth. It is probably true that most people who succumb during or shortly after removal of teeth have had some impairment of vital functions which might soon have ended their lives. Even if this fact is well established subsequently, there may nevertheless be great bitterness among surviving relatives and friends. Inordinate fear of simple dental operations prevails in the community. The dentist may suffer loss of practice and prestige. He may be compelled to defend costly and enervating damage suits. In one case, suit has been filed against hospital, physician and dentist. This patient was cared for in a well-equipped hospital; which tends to show that employment of hospital facilities and services of a physician does not supersede ability and judgment on the part of the dentist.

In the enormous number of dental operations performed under nitrous oxid

without a fatality straight nitrous oxid was employed. Usually, not more than two minutes were consumed in administering the anesthetic and performing the operation. It probably was not possible in this short time to superimpose enough shock upon impaired vital functions to produce immediate or closely subsequent death. The appearance of the patient became so alarming that the anesthetic was rarely pushed too far. But that method is now obsolete. We are using better, more efficient methods, but methods which are certainly more dangerous for certain classes of patients.

Parallel improvement in methods of determining who may safely submit to these new types of anesthesia and new types of operation has not been made. We should have a plan of procedure calculated to protect us before the law and before the bar of public opinion, in case we have a fatality. Since we cannot write death certificates and "bury our mistakes" as physicians can, we must not make them.

McKesson's and Lundy's papers[1] in THE JOURNAL and "Anesthesia" by Gwathmey should be constantly consulted. All three of these men have M.D. degrees. Their problems are somewhat different from ours; but Dr. Lundy, who is chief of the Section on Anesthesia at the Mayo Clinic, seems to have a peculiar grasp of this situation as it applies to us. He says that this is probably true because he "grew up on the foot of his uncle's dental chair." Lundy recommends that the A. D. A. formulate and recommend a routine that dentists may follow in doubtful cases when gas anesthesia is contemplated.

He assures us that the A. M. A. would cooperate and sanction such a move. The benefits to be derived from such cooperation and sanction are obvious.

After a long conference, we decided that, before again presenting this matter to you, it should be tried out in an exodontia practice.

I will now present this régime as it has been tried, and can say for it that, thus far, it has been a source of great satisfaction to me. It seems to have been well received by the patients, and by the dentists and physicians who have referred patients.

1. Ask the prospective patient when and for what reason he last consulted a physician. This question alone will reveal many conditions contraindicating long anesthesia and extensive operations.

2. Do you get short of breath on walking up stairs? If so, a competent physician should examine the heart, and sanction the giving of any anesthetic.

3. Do you frequently have sharp pains in the chest (in the region of the breast bone)? If so, suspect angina pectoris and do not give any general anesthetic, nor a local with epinephrin. Consultation is advised.

4. Inquire as to whether the patient or any male relatives have been known to bleed excessively.

5. Take the temperature; count the pulse and respiration, and learn the meaning of variations from the normal.

6. Secure, and learn to use, the stethoscope, blood pressure apparatus and coagulometer, and to interpret intelligently what they reveal. This may be accomplished by study or by instruction from medical friends or in study clubs or in short courses in medical schools, where available.

1. McKesson, E. I.: Influence of Certain Diseases on Technic and Other Considerations of General Anesthesia in Exodontia, J. A.D.A., 16:11 (Jan.) 1929. Lundy, J. S.: Anesthesia for Dental Operations, J.A.D.A., 17:1012 (June) 1930.

7. Gwathmey, in "Anesthesia," gives as a contraindication for chloroform: "In children, of average height, though of slight physique, pale complexion, timorous disposition, enlarged tonsils and adenoids, with enlarged papillae on the base of the tongue." Experience indicates that these are also contraindications for gas anesthesia in children.

For many years, I believed that premedication was unnecessary and undesirable. Occasionally, after a failure to anesthetize a patient successfully, morphin, one-sixth grain, and atropin, one-one hundred eightieth grain, was given hypodermically, and the case was successfully completed. The use of morphin, while an excellent synergist, and an excellent preventive of shock, prolonged the necessary postoperative care and induced nausea, both tending to disrupt office routine. Now, morphin is rarely used, but we do employ premedication in every case in which it can conveniently be done, and insist on it for certain cases, even if it is inconvenient. On the advice of Lundy, pentobarbital sodium (introduced as nembutal) in doses varying from one-half to 1½ grain is given by mouth twenty minutes or more before the anesthetic. The dose varies with the individual. One-half grain is given to children from 8 to 12 years of age; 1 grain to small weak adults, and 1½ grains to the robust adult. These small but effective doses are rarely, or never, contraindicated.

After the drug is taken, the patients are allowed to lie quietly in a rest room for twenty minutes at least, or until there is convenient opportunity to anesthetize and operate.

The results are most pleasing. Patients take less anesthetic, tolerate more oxygen and rarely struggle or become vociferous in the excitement stages. They are much quieter and happier at the conclusion of operation; and there is a lessened tendency to nausea and shock.[2] The drug is quickly eliminated, and the rest room period is not inconveniently lengthened.

It is commonly said of those of us who use nitrous oxid that we "give gas." In truth, the gas must be given by our anesthetist. By far the best material from which to create an anesthetist is a newly graduated hospital-trained nurse. Many nurses, at the completion of their training, are desirous of obtaining steady employment, with regular hours. They have become used to dealing with people in those abnormal conditions of mind and body induced by pain and fear. They are reliable and accurate and instil confidence in the fearful; and it is not misplaced confidence, for they are familiar with grave situations and are not likely to lose their heads in a crisis.

Before a gas anesthetic is given, the name, address and telephone number of the patient are taken. It is desirable that someone accompany the patient, especially when leaving the office after operation, but it is not desirable that friends or relatives, especially of children, remain in the room during operation.

Many reasons may be given as to why spectators should not be allowed in the operating rooms. Chief of these is that the attention of the operator and the anesthetist will invariably be divided between them and the patient at a time when the patient should receive undivided attention.

When gas is given to a patient in a dental chair, the patient is seated in

2. Crile, G. W., and Lower, W. E.: Surgical Shock and Shock With Operation Through Anoci-association, Philadelphia: W. B. Saunders Co., Ed. 2, 1920.

quite an erect position. The head and backrest are adjusted so that head, neck and trunk are in such relation that breathing is natural and easy. Anything tight about the neck is removed. Disquieting questions and the giving of stimulants or sedatives are avoided at this time. An air of confidence, assurance and optimism should prevail. It is generally believed that in office cases patients do better if not deprived of their usual food at regular meal times, provided they are normally healthy and that the meal has not been excessive or indigestible. All questions as to the advisability of the patient's taking the anesthetic should be disposed of before he takes the operating chair.

The nasal inhaler is adjusted, but not connected to the machine. At first, the patient breathes only the air through it. If he remains calm, the inhaler tubing is connected with the machine, and the mixture of gases is turned on and the timer started. The exhaling valve is slightly opened. There is some rebreathing, but part of the exhaled gases escape through it. The prop is adjusted and the mouth covered with a ball of short fiber cotton. At about twenty seconds, a 10-foot fiber trunk strap 1½ inches wide is gently placed around the back of the chair and the patient's waist. The patient should be asked to fold the hands in the lap, thus permitting the strap to efficiently restrain the arms and hands. The end is brought through the buckle, then looped around under the knees, drawn up snugly and tied in a slip knot after the gases have been inhaled for one minute and twenty seconds. The strap is applied routinely, in all cases. Generally, it is superfluous, but if it is needed, it is awkward and disconcerting to apply after its need becomes apparent. It is removed as soon as the patient is seen to be recovering, and seldom does he know that it has been applied.

One minute is allowed to elapse, during which the patient breathes a mixture of 93 per cent nitrous oxid with 7 per cent oxygen, and a tiny trickle of carbon dioxid, flowing at the rate of from 5 to 10 gallons an hour. About 3 gallons a minute supplies the ordinary need for free and easy breathing.

When the anesthetist is told by the timer that the patient has had the foregoing mixture for one minute, the oxygen is turned off until anesthesia is complete. This occurs in from thirty to forty-five seconds, in most cases. At this time, the rolling movement of the pupil will have ceased; it will have become fixed, and will usually be turned down and in. The mouth pack is adjusted in such manner as to prevent blood or tooth fragments from reaching the throat, and as far as possible to prevent air from passing through the mouth to the lungs. The oxygen is again turned on to 7 per cent.

As the operation begins, if there is a third member to the operating team, she is best employed in operating and using an aspirating apparatus. She follows every move of the working point of the knife, periosteum elevator, lever or forceps, with the aspirating tip. In her left hand, she holds a sterile sponge, with which she alternately clears clots and débris from the aspirator tip and the instrument being used by the operator. If the tip becomes clogged, she must be prepared to clear it quickly or discard it and replace it with another, without loss of time.

All swabbing is thus dispensed with. The aspirator makes for cleaner, neater operating. Tissues being operated upon are always clearly in view. Fragments

of broken tooth substance, fillings, etc., may be picked up and removed by it, as well as blood and saliva. It is an adjunct to operating which makes possible and practical many operations heretofore impractical under gas.

The anesthetist, if competent, is at all times left strictly alone. The operator who nags at an anesthetist will never have a good one.

Suggestions such as "a little more gas," "a little more oxygen," "the patient is too deep," and "the patient is to light" tend to make the anesthetist watch the operator instead of the patient and the apparatus; and thus the acquisition of that confidence and assumption of responsibility for the anesthetic that are so to be desired is retarded. We may make or break a beginner in a very short time.

Many cases may be completed with these percentages of the gases, but sometimes oxygen will have to be increased or decreased; and sometimes, the nitrous oxid will have to be increased or decreased. The carbon dioxid may usually be left flowing at between 5 and 10 gallons an hour, during the whole procedure.

We believe that the difficulties we formerly had in that anesthesia became light at critical periods during operation were due to shallow breathing. We believe that administration of carbon dioxid keeps the breathing deep and regular, maintaining sufficient intake of nitrous oxid to afford satisfactory anesthesia; and sufficient intake of oxygen to supply the normal need. We believe that, without carbon dioxid, there is a tendency for the breathing to become shallow, so that anesthesia becomes light, but that, at the same time, the patient may become cyanotic because of the shallow breathing, which prevents his getting sufficient oxygen.

There is less danger of postoperative pneumonia and exhaustion and shock, following long operations, if complete lung ventilation is maintained all through, and to the completion of anesthesia and the operation.

It is safer and easier to operate under a smooth, even anesthesia.

The bag should be comfortably filled at all times. If it is collapsed, gas may be escaping around the inhaler (perhaps the commonest fault of a beginning anesthetist); or the patient may have an unusually large lung capacity and is depleting the bag at each inhalation. Obviously, the remedy is to better adjust the inhaler, or to increase the flow of gases, else, in either case, the anesthesia may become too light.

If the fluctuations of the bag become too shallow, it may mean a leak around the inhaler, or it may mean that free respiration is being interfered with. The operator may have pressed the pack back too far, and if so, it must be readjusted. If operating on the mandible, he may have pressed it too far down, and backward; or the position of the head may have changed, so that respiration is interfered with. Any of these things, if not corrected, may soon cause the anesthesia to become too light, or the patient to become distressed from lack of oxygen. A good anesthetist will learn, without being told, to support the mandible when it is being operated upon. She quickly sees that an unsupported one is hard to work upon and that it is impossible to maintain good anesthesia when the mandible is being pressed downward and back.

Anesthetist and operator must learn to distinguish the jerky cyanotic movement of a patient from the struggling of light

anesthesia. Cyanosis requires the momentary lifting of the inhaler for a breath or two of air or an increased oxygen supply. The struggling of light anesthesia may demand increased flow of the gases and a lessened supply of the oxygen.

Light anesthesia is not dangerous, but cyanosis is. If cyanosis is mistaken for light anesthesia, nitrous oxid forced and oxygen withheld, the patient may quickly reach a dangerous stage. What is then required, and quickly, is air or oxygen in the lungs. A good mouth opening gag should always be at hand, because, in cyanosis, mouth props may be dislodged and, in violent efforts to obtain air, mouth packs or tongue may be drawn back into such a position as to obstruct the air way.

Muscular contraction may close the jaws so that the air way cannot be freed. We have every reason to suppose that deaths have occurred, while patients were under nitrous oxid, when the symptoms of light anesthesia have been confused with those of cyanosis; that anesthetist and operator, in their anxiety to bring the operation to a successful culmination, have increased the flow of nitrous oxid, decreased the amount of oxygen, and disregarded obstructions to the respiration, until the patient has been smothered; that even when this has been done, if the air way had been promptly freed and proper methods of resuscitation had been employed, air and oxygen entering the lungs, such patients could probably have been saved.

Nitrous oxid is not toxic. All other anesthetics are. Suffocation is about the only thing that we have to fear during anesthesia. The heart action is said always to continue for quite a while, even if the respiratory center has been paralyzed, when nitrous oxid is supposed to be the cause of death. Usually, though perhaps not invariably, there is plenty of warning, before respiratory failure. In a very few cases, nitrous oxid is believed to have caused paralysis of the respiratory center, and patients have succumbed at last, after many hours of artificial respiration, during which the heart action remained fairly good.

When respiratory paralysis has occurred, it is probably true, though this is hard to say definitely, that the anesthesia has been pushed entirely too far and the anesthetic has not been given intelligently.

There is still the possibility that the surgical work or some impairment of vital functions has been the cause. It would seem that if nitrous oxid could cause such paralysis, some of those who have given it thousands and thousands of times would have encountered it, even in short cases.

When alarming symptoms occur, the anesthesia and all operating should be immediately discontinued. Recourse to stimulants, such as strychnin and ammonia are not advised. Oxygen and carbon dioxid should be given and every effort should be made to reestablish normal respiration. After operation, should respiration continue to be labored, the skin will be moist and cold with perspiration, and pallor, cyanosis, vomiting, restlessness and anxiety continue. Should there be lowered blood pressure (which we should be prepared to determine) with increasing mental dullness and lessened sensibility, we may be dealing with surgical shock, and this should be combated promptly. Body heat should be conserved, absolute rest insisted on, and sleep encouraged or induced by morphin.

The foregoing symptoms may occur promptly and be partly recovered from, and then a relapse occur. They may occur

some time after operation, and by the patient are usually attributed to the "gas." Perhaps some of us who operate with gas are mystified by reports of such symptoms. It is to be recommended that all who operate with gas study authoritative articles on surgical shock and endeavor to recognize and treat it as such, and not to consider it as a post-anesthesia symptom.

If a good anesthetic technic is employed, if care and scientific knowledge are used in selecting cases for operations under nitrous oxid, and if reasonable operative skill and judgment are employed, the danger of encountering alarming or distressing conditions from the use of nitrous oxid as an anesthetic and the danger of encountering surgical shock, from the operations we ordinarily perform, is slight.

That both possibilities are always present applies as well to any surgical procedure, under any anesthesia, local or general.

We should study and strive to be prepared to meet intelligently any such situations when they arise. We should not wait until after a calamity has occurred to become informed as to how to recognize and combat it.

What has been said should in no wise deter anyone from using this most excellent method of anesthesia, under proper auspices, and where it is indicated. It should encourage those who are interested in its use to use it more confidently, more intelligently, with greater advantage to their patients and themselves if they will be stimulated to further study and observation in the matters here touched on, necessarily rather superficially in the time and space at my disposal.

PROBLEM OF FULL DENTURE CONSTRUCTION FROM THE STANDPOINT OF THE GENERAL PRACTITIONER*

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FULL denture construction continues to constitute a goodly part of the average dental practice; and it likewise continues to present its full share of problems. In this paper, I have not attempted to theorize on the intricate problems of articulation or even to present anything new on the subject, but rather to indicate briefly the results which, in my opinion, the patient has a right to expect. A description of these results, together with a discussion of the methods of obtaining them, will be the purpose of this paper. Briefly, the requirements of a denture restoration are comfort, efficiency and pleasing appearance, and our success must be measured by the degree in which these requirements are met. We like to talk with pride of the great strides we have made in denture prosthesis, and while this pride is in a measure justified, we must not lose sight of the fact that we still have a long way to go. The change has not come in

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the objective but in the degree in which we attain perfection. In my opinion, esthetics is the phase of denture construction in which the greatest improvement has been demonstrated, and this has been brought about by the manufacturers' supplying us with improved materials with which to work, as well as by our own efforts. I think it should be our object to so standardize denture construction that there will not be such a variance in the quality of service rendered patients with a given diagnosis.

Edentulous patients must be served. They must have a service that meets the requirements we have set out and they must have this service at a fee commensurate with their ability to pay.

While the standard of denture service has been materially raised during the past years, the methods or technics employed in obtaining these results have been so many and varied that the general practitioner is very much at a loss to know whether he is employing the most reliable methods.

We should be consoled with a knowledge of the fact that if dentistry is to be a profession instead of a trade, there can be no rigidly standardized technic to follow in dealing with edentulous patients. While we look with pride on our increasing prosthetic prowess, let us also look at the patients who for twenty-five years have been served with dentures which, in the opinion of the wearers at least, have met fairly well the requirements which I have enumerated. How often do we see some new technic enthusiastically promoted, and then make some patient a new denture rigidly following instructions, and, in the end, have the patient signify his preference for his old denture?

These remarks are not made in an effort to minimize the degree of advancement that we have made, but I wish to insist that the fundamentals of denture service remain unchanged and we cannot alter them by surrounding ourselves with an impressive array of new and complicated paraphernalia. When we speak of equipment in denture work, we generally think immediately of articulators, and while I do not mean to attempt to justify the employment of the plane line instrument, I do believe that it is possible to build a good denture on almost any of the so-called anatomic articulators. The problem of full denture construction for the general practitioner, reduced to a few words, means supplying a large number of patients with dentures that are efficient, comfortable and of pleasing appearance and at a fee that will be fair to ourselves and yet not be prohibitive for the masses. The economic phase of this problem demands the development of a technic that will produce these results within certain time limits.

Let us attempt to analyze the three major requirements which I have named, comfort, efficiency and esthetics. Dentures, to be comfortable, must meet, in a measure, the requirements of efficiency and pleasing appearance. Likewise, to be efficient, they must be comfortable, etc. These requirements embrace stabilization with a minimum of trauma, together with maintenance of tissue health and contour.

I believe that patients should be supplied with dentures within two weeks after the natural teeth have been extracted. The old practice of extracting the teeth and having the patient wait for from six months to a year for his dentures is obsolete. The patient accustoms himself to dentures much more readily if they are placed soon after extraction, to say nothing of the added esthetic value and maintenance of tissue tone.

No patient should attempt to get along with one set of dentures. We must supply the patient not merely with a set of teeth but with denture service. This necessitates educating our patients. It necessitates changing some ideas that have been prevalent among them for years. I believe immediate denture service following extraction of the natural teeth to be one of the most important things that we can offer to promote prosthetic dentistry. I admit that it is, in some instances, a very difficult problem to effect immediate denture service, but, virtually always, we can insert some sort of a substitute. It need not contain the full complement of teeth, if the denture space prohibits it. In some cases, it will be necessary to eliminate anterior gum facing in order to avoid lip distortion, but the maintenance of facial contour, tissue tone, the normal denture space, etc., richly repays us for our efforts. A little trimming of the alveolar process at the time of extracting the teeth greatly facilitates the immediate placing of dentures. Especially is this procedure of advantage in the upper anterior region. We have had quite a little success with immediate denture service, and I am glad to see that it is coming to be more commonly employed. While the problem of retention may cause some difficulty in some of these cases, the patient will generally tolerate the dentures if he understands their advantages. One of the main requirements for success in this work is to put the patient in the right mental attitude by explaining the limitations as well as the advantages of this service.

This is not intended to be a treatise on immediate denture service. My excuse for speaking of it at length is that I consider it a solution of one of the major problems of denture construction.

Another important problem of full denture construction is the maintenance of health and contour of the tissues which support the denture bases. The problems of denture retention and tissue stability go hand in hand. Let us examine the factors in these conditions. Impressions are the first thought. For me to insist before an audience of this kind that any one method or material is ideal for full denture impressions would be to promote an argument. Such is not my belief. One operator may produce the desired results with compound, another with plaster and still another with a combination of these materials. Use the method in which you are most proficient. For the average man, I believe that compound in combination with plaster of Paris will afford the best results with the greatest economy of time. Some operators are producing beautiful results with compound alone, but it requires painstaking effort and a great amount of time, and we are considering a service for the masses. One of the most common errors made in impression work is overcompression of the border tissues. This mistake is easily made with compound or even with compound and plaster, if the primary impression is not properly trimmed before finishing with plaster. No body tissue will tolerate excessive compression, and in denture work it quickly produces atrophic conditions, which are followed by loss of retention. If we take the primary impression in compound and properly trim the borders thereafter with a plaster finish, we will utilize about all the conditions which make for a good impression without overcompression of the border areas. We should always use as little material as is consistent with the securing of a good impression. The ideal condition would be to have no more material in the impression than we are to have in the finished base. I will say in this connection

that we have had quite a little success with some of the new plastic impression materials in recent extraction cases, especially where there were marked irregularities and undercuts.

Their chief advantage over plaster of Paris is in their being removable in one piece and in not being so annoying to the patient. Casts should be run in artificial stone. This material has been improved in both dimensional stability and setting time. It takes little longer to make a stone cast than it does to make one of plaster and they are superior to plaster in every way.

Occlusion and contour models for recording the various measurements should be built upon hard bases. Vulcanite is ideal, but the time element is a point against it and the shellac bases will suffice. It is impossible to make accurate records on occlusion models made of ordinary baseplate wax. The end-results of full denture work are so dependent on properly constructed occlusion and contour models that it behooves us to spend a little extra time, if necessary, in an effort to attain perfection in this phase of the work.

Securing and maintaining balanced articulation is one of the all important problems of denture construction. To begin with, I believe that the casts should be mounted in the articulator with the aid of the facebow. I have heard several discussions recently in which the use of the facebow was belittled. However, I cannot but think that it is an advantage to have the casts mounted in their correct relation to the condyles and this is just what the facebow enables us to do. The added time is negligible when we consider that some sort of a support to aid in making a symmetrical mounting is necessary anyway. Centric and protrusive relations should be recorded in very soft wax or compound. The reason for this is twofold: (1) it is more accurate and (2) it will produce dentures that are not so likely to traumatize the subtissues. It is more accurate because it is not necessary for the patient to exert pressure in closing, with a consequent compression of the resilient tissue. The resultant dentures are not so likely to traumatize the tissues because, when the patient closes, the teeth will occlude uniformly without so much tendency on the part of the base to move and cause friction on the subtissues.

The selection and arrangement of the teeth are probably the most important factor in making an artificial denture a real piece of artistry rather than just a dental plate. It is a common error to select teeth that are too small and white for our cases. Nothing brands a denture as artificial so quickly as an error in this part of the work. I think that the patient and even the patient's family should be consulted at length in this step of the work. To attempt to force our ideas on them will only produce antagonism and dissatisfaction. Nearly always, by demonstration and explanation, we can lead the patient into agreeing with our ideas on the selection and arrangement of the teeth. A cast of the natural teeth before extraction is of material aid in the selection and arrangement of the artificial ones. The hue of the natural teeth should be recorded at the same time. Teeth that are too small or too light in shade must not be used. The appearance of the case may be greatly enhanced by effecting slight irregularities in arrangement and by using two or more shades in the same set. Slight modifications of form by grinding with stones and repolishing is also a help. When it comes to the arrangement of the posterior teeth, we must be guided by the mechanical limita-

tions of balancing the occlusion. Proper articulation is probably the most important single requirement of an artificial denture. I would much rather sacrifice perfection in impression work than in articulation. Faulty articulation not only makes for masticatory inefficiency and denture instability, but also promotes atrophy of the osseous support of the denture. Any time spent in perfecting articulation in denture work is well spent. Every full upper and lower denture should be remounted in the articulator after vulcanizing or curing and the articulation improved by grinding. A final grinding in the mouth with an abrasive paste will help to reduce minor inequalities. I am not in favor of close locked occlusion or deep cusp teeth. Both tend to traumatize the subdenture tissues. The new channel and inverted cusp teeth have some advantages. My experience with them has been insufficient for me to be too critical, but I hesitate to adopt a tooth that deviates so far from anatomic form.

While vulcanite is still the standard of perfection in denture bases, it is being superseded in a great many cases by some of the condensite or cellulose products. I believe that out of this vast array of new material, a satisfactory substitute for vulcanite will eventually be evolved. There is no question that it is superior to vulcanite in appearance, and the strength and stability of the material are being constantly improved.

While the ideas embraced by this paper may seem to appear as rather elementary, I have intended that they should be. It was not my purpose to write a paper for the specialist. In my opinion, I have not included any requirement that could be satisfactorily eliminated from the technic necessary to produce dentures for patients of even the most meager financial means.

SUMMARY

In summarizing, I shall name some of what I consider the most important factors in solving the problems of full denture construction.

1. We must be able to diagnose oral conditions sufficiently well to satisfy ourselves as to the possibilities and limitations of building dentures for a given case.

2. Having satisfied ourselves regarding these conditions, we explain them to the patient. The best possible artificial denture is wholly unsatisfactory to the patient who has been led to expect more.

3. We must develop our impression technic to a point where we can produce accurate copies of the areas to be covered by the bases, producing them without distortion of movable tissue or overcompression of borders.

4. The least possible time should elapse between the extraction of the natural teeth and the substitution of artificial ones.

5. We must teach our patients that there is no such thing as a permanent denture, that the supporting tissues are constantly changing and the dentures must be occasionally renewed if we are to retain the tissues in their maximum state of health, efficiency and comfort.

6. We must recognize the importance of balanced articulation and exert every effort to secure it in our dentures. This requirement makes the use of an anatomic articulator mandatory.

7. We must produce dentures of pleasing appearance. This requirement contemplates first the building of occlusion and contour models which restore or preserve facial dimensions. Almost always, the operation of substituting artificial teeth for the natural ones is accompanied by loss in vertical facial dimension, as well as loss of contour.

This should be anticipated and guarded against. Let us avoid the selection of teeth too small and too light in shade and learn to develop artistic irregularities in tooth form, arrangement and hue.

While full denture construction presents some of the most difficult problems of dental science, it also presents some of the greatest opportunities for demonstration of skill. The change from natural to artificial teeth is a real event in the life of a patient. Ours is the service of last resort. It comes after all conservative measures have failed. If we, as general practitioners, will put the same painstaking effort in denture construction that we do in the most intricate conservative operations, our service will hold some pleasant surprises for our patients instead of being fraught with bitter disappointment, and the standard of this branch as well as the entire profession of dentistry will be raised.

DISCUSSION

Field Farrar, Ft. Worth, Texas: Dr. Hughes has convinced us that he is a student as well as a teacher, that he has without doubt run the entire gauntlet of denture construction and problems encountered by the general practitioner. After all, problems of the man who confines his efforts to dentures exclusively are no greater than those of the general practitioner, only of a different complexion. The average patient knows no difference. His or her comfort and appearance are just as important, whether they be in the hands of a small town general man or in the hands of a city prosthodontist. In other words, the general practitioner must give satisfactory service, if he expects to succeed, just the same as if he were a specialist. In fact, all things considered, the burden is relatively greater on the general practitioner. His cases usually originate within his own practice and he carries them through from extraction of teeth and a preparation of the mouth, to insertion of the first dentures and all the trying ordeals that accompany this great event of his patient's life. All of this usually at a fee, if collected at all, which is only a meager one considering his costs and efforts. I like the way Dr. Hughes handles the question of rigidly standardized technics and an array of articulators and other paraphernalia. He knows that anyone with skill and aptitude may construct a fair set of teeth on one of Campbell's famous barn door hinge articulators just as well in proportion as on the most exact articulators built. To diverge from Dr. Hughes' paper a little: I have often wondered if articulators, or grinding gigs, were not the fathers of the present-day cuspless teeth that are now being quite generally used. Immediate denture service or near immediate denture service should be given serious consideration, that is, if you are not already using this procedure in your own practice. It is most helpful in maintaining vertical dimension and tissue tone as described by Dr. Hughes. It is also equally valuable in bolstering up the morale of the patient, better fitting them for the reception of the second dentures; to say nothing of allowing the patient time to acquire habits that are entirely unnecessary and later have to be overcome before the successful use of dentures is assured. As to impressions, he realizes no one material or technic can be used best by all operators and it is sometimes necessary to combine two or more materials. "All compound" impressions are by far the most difficult to take. Only a few outstanding men have been able to master this form of impression. The majority had better complete the denture on a good snap impression than to continue adding insult to injury by trying to perfect the compound impression first in one place and then in another, ending with just a good tray to use in combination with plaster of Paris.

INFECTION WITH MONILIA FOLLOWING EXTRACTION OF TEETH*

By T. A. HARDGROVE, D.D.S., Fond du Lac, Wis.

THE record of this particular case is of value because it reveals an infection that we do not usually come in contact with, and which, undoubtedly, has been passing under our observation without proper recognition. It also shows the extent of the tissues involved by the infection and its toxins and the effect on that tissue, with successful treatment of a very difficult case, one that looked entirely hopeless, and would have terminated fatally had we not eventually recognized the type of infection responsible for the trouble. It is of the utmost importance that a diagnosis be properly made, and then, if proper treatment is given, these patients need not die.

The case record shows also the value of an extensive or investigatory study to determine the exact nature and character of any infection in which the oral cavity is involved, and proves that we should not look on our limited field with its continuity of tissue as one that we should observe alone, or without regard to its relation to all the tissues of the body and their pathology.

When we are cooperating with a physician in these extraordinary cases, that cooperation should be of the understanding and useful type for both the physician and the patient. In other words, if the physician is in need of assistance and unable to formulate judgment in this field, which naturally belongs to the dentist, and is unable to make a diagnosis, and suggests treatment, it is an opportunity of the dental profession to be able to assist in a diagnosis and treatment.

This case was presented to me, May 21, 1930, by the dentist to whom the patient came for the extraction of some teeth, in April, 1930. The mouth was in an unsanitary condition and the patient himself was in bad condition. The left lower second molar had been carefully removed. Procain was not used in the manner that it is ordinarily used to block the mandibular nerve, but rather by infiltration around the tooth.

Shortly after the extraction, the patient began to have pain of a rather persistent character, with only a small swelling in the buccal region, not deep in the tissues, somewhat outward from the bone itself, and not beneath the periosteum. It was difficult to understand why this patient should have pain with no evidence of an abscess. Since nothing relieved him and the condition was getting worse, an incision was made in the buccal region, May 22. No pus was found—it was not anticipated that pus would be found—but the tissue was opened in order to determine the type of infection present. The microscopic study at that

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time did not reveal anything except the conditions ordinarily found and which cannot be avoided in culturing in a lesion of that kind in the oral cavity.

The examination was not so complete as it should have been. By that, I mean that no effort was made to find some sort of fungus organism, although it was decided to administer potassium iodid in order to control a possible fungus infection. The dosage was 10 grains, given four times a day. The patient apparently made a decided improvement and the pain disappeared. It seemed that further treatment would not be necessary, but in a few days the pain returned. The swelling had continued, but the pain was intensified long before the swelling was pronounced.

The temperature was not extreme. In the absence of the patient's physician, S. E. Gavin, his assistant, A. C. Florin, was called in, and on the basis of our experience and his judgment, it was thought best to increase the potassium iodid to 30 grains, three times a day. There was again a decided improvement, with disappearance of the pain. In a week or ten days, there was a recurrence, with more pain and discomfort and increased swelling. The Wassermann reaction was found to be negative. There was no spinal puncture made in this case. As the patient was by this time becoming so weak that proper care could not be given at home, it was decided to hospitalize him to control the diet and improve sanitary conditions.

The patient was therefore admitted to the hospital and placed under treatment and observation. He was able to walk into the hospital, July 8. The left side of his face where the tooth had been extracted was considerably swollen, and the patient was unable to open his mouth very wide. The temperature was 99.2 F. It had never been high. External heat was applied and liquids were given freely, particularly orange juice. Potassium iodid was continued. July 9, the patient could open his mouth much wider and was able to take a soft diet. The appetite was fair, but the disease progressed in spite of temporary relief. July 10, the condition was virtually unchanged. Heat applications were continued to the left side of the face. The swelling subsided somewhat, but it had periods of remission and exacerbation. July 13, there was no improvement and the swelling remained unchanged. There was a period in the treatment of this case when conditions would improve and subside, because of the patient's natural resistance to the disease or in response to treatment.

It was finally decided that the swollen areas on the left side of the face should be opened, so that drainage could be established. July 14, an opening was made at the angle of the jaw and the symphysis. A small rubber tube drain was placed in each incision, and the patient apparently made some improvement; but after studying the case, we could easily see that this was just another cycle in the progress of the disease. The tubes remained in for eight days, with only the ordinary secretion that might be anticipated in the presence of an irritating drain. The patient was improved as he had been before and was allowed to go to his home, August 16.

During this time, the potassium iodid had been continued. The patient returned to the hospital again, August 24, with a very much more extensive swelling of both sides of the jaw, head and neck. This swelling was not confined entirely to the left side where the extraction had been, but extended across the face, head

and neck, and involved eyelids and lips, and the face generally.

The patient had now reached a point where the swelling extended from the top of the head down to the breast, involving all of the tissues, a swelling so hard that it was boardlike. Certain areas had become very sensitive to the touch and tissues began to develop blisters. The appearance of the mucous membrane suggested that there was water underneath it, but there was no fluctuation on palpation at any time. The blisters were opened and found to contain a material that looked like pus. This was subjected to laboratory examination.

In order to check up and to avoid the chance of error, the material was examined in the Wisconsin State Laboratory. The report showed monilia. This clarified the situation somewhat. Previously, it was found that potassium iodid aided in reducing the edema. It was now found that neo-arsphenamin would sometimes, in from twenty-four to forty-eight hours, cause the edema to disappear almost entirely, but it would return. On the theory that the patient showed a tendency to improve under arsenic, it was again administered. Previous to this, the patient had been given mercurochrome intravenously, with no special benefit. Mercury was rubbed in and seemed to do more harm than good.

The patient had a very stormy time during his entire illness and there were times when he appeared about to die. During the administration of nitrous oxid, he came near dying, and was brought back only by artificial respiration and rectal dilatation and the operation discontinued. The patient's blood count varied. The white cell count once went as high as 59,000 and was probably higher at times.

It was decided that in order to keep the patient alive, a blood transfusion should be given. This was done twice, 200 c.c. being given September 15 and 450 c.c., September 18. The patient seemed to be growing worse. There was a very little literature on moniliasis at this time, but it was found that Castellani at Tulane University had reported eleven cases. The treatment outlined by him was about the same as the treatment that we were giving the patient. After a consultation with his physicians and after many physicians, surgeons and dentists had seen the case, it was decided that the most promising treatment was arsenic or neo-arsphenamin therapy, and, to the point of toleration, the patient was then given this at periods found best suited to the case, which was about every three days. This was continued until the skin became quite dark. By this time, the patient was so reduced in flesh so that he was little more than skin and bones.

Not only were the tissues about the face, neck, and head involved, but the extremities also. Pain developed in the arms, and an abscess developed in the deep tissue of the right arm which, on application of heat, broke open, subsiding when neo-arsphenamin was given. The patient at times developed a pain in the chest from a varying circulation, or from the infection itself. Edema about the neck and chest was so extensive that it was feared that the patient would strangle.

In this extreme situation, one dose of neo-arsphenamin would bring complete relief, and the storm would pass for a time. Neo-arsphenamin was now given to the point of toleration, and the patient began to improve, the symptoms subsided and the skin turned dark. The infection was regarded as under control, and the matter of nutrition was now given attention. Forced feedings were

given, and the patient was allowed to eat freely of proteins. Immediately, he began to show improvement. He had gone from 195 to probably 125 pounds. He now began to improve and took on weight. He had no return of the former symptoms. December 16, he was allowed to go home. After about a month, during which time he made occasional calls at my office, he began to complain again of pain in the region where the tooth had been extracted. One more dose of neo-arsphenamin, and that entirely disappeared.

He had by this time begun to work at a light occupation, and he gradually took over his own work. He appeared once thereafter, in about two months, with an abscess in the hard palate, which included only soft tissues. The abscess, which was rather superficial, was opened and pus was evacuated. There was no further disturbance in the palate.

To sum up this case: This patient did not take good care of his mouth, in which there were many decayed teeth and a general unsanitary condition. His living conditions were not of the best. This infection was undoubtedly present when he went to the dentist to have his tooth extracted. The dentist used good judgment in not making a deep block injection. The infection undoubtedly was carried on the point of the needle, which could not be avoided, and which proves to us that we should anticipate some of those rare infections and sterilize accordingly, taking into consideration all of the factors in an infection.

Undoubtedly, the infection came from food not well taken care of, and perhaps in a stage of decomposition. The fungus is found more often on fruits from the southern part of the United States, or in bread. My suspicion was aroused when I found this organism under the microscope. Not being familiar with the organism, I asked the pathologist what it was. When the diagnosis was established at the University of Wisconsin, it was found that the organism corresponded with that I had observed. It was our error that we did not recognize its pathologic possibilities.

CONCLUSION

Infection with monilia is slow in its development, the earliest predominating symptom being pain. There is a slight induration. The condition is progressive. The organism could not in this case be recovered from the blood stream. It travels by continuity of tissue and through the lymphatic system. It produces an edema in which there is no breaking down of tissue unless a mixed infection occurs. There is no limit to the amount of edema. The effect may be remote and any tissue in the body may be attacked. The bony tissue seems to be the only one that was not affected in this case. We must recognize it as one of the diseases that are liable to come under the dentist's observation, to be diagnosed and treated by him.

This case establishes, too, the fact that this particular fungus yields to treatment with neo-arsphenamin, and while it is not cured by potassium iodid, it was at least arrested in this case temporarily and periodically. For a cure, the patient's tolerance to neo-arsphenamin should be noted, and this drug should be given accordingly until the point of saturation is recognized by the disappearance of symptoms and a discoloration of the skin. It should not be carried beyond the point necessary. Thus, when the infection has been brought under control and there is evidence that the patient has built up a resistance against it, the nutritional factor is of importance. Nutrition in the

case reported could not be pushed earlier because the patient could not tolerate food to that extent. When the infection is eliminated, the matter of nutrition takes first place in further treatment of the case.

A NEW FUSIBLE ALLOY FOR DENTAL MODELS

By CHARLES E. FOWLER, D.D.S., New York City

PLASTER, synthetic stone, amalgam and fusible alloys have been used in the production of models for plate and partial bridge fabrication in dental laboratories. Plaster models are fragile and for this reason are not satisfactory, especially for the anchor or abutment teeth on which the clasps of a partial bridge must be fitted. Synthetic stone gives better results than plaster, but the repeated fitting of the clasps causes excessive wear. Amalgam produces models of sufficient hardness to resist wear, but is expensive and is more difficult to form than the other materials.

Fusible alloys offer several advantages over the other materials; for example, the alloys can be poured into the green investment or impression without waiting for the impression to age, as is required by the other methods. The fusible alloy models can be remelted and used again when the model becomes obsolete.

I have had most satisfactory results when using an alloy of bismuth, lead, tin and antimony melting at about 248 F. It is hard and strong, does not shrink during solidification and gives sharp, clear-cut castings. Models made of this alloy permit the repeated adjustment of plate and bridge clasps and eliminate the danger of wear and distortion ever present with models made of the softer and weaker fusible alloys, yet offer all of the advantages to be derived from the use of fusible alloys.

Jour. A. D. A., March, 1932.

MORPHOLOGY AND BIOLOGY OF THE ENAMEL TUFTS, WITH REMARKS ON THEIR RELATION TO CARIES*

By THEODORE B. BEUST, M.D., D.D.S., F.A.C.D., Louisville, Ky.

THE significance of the markings seen in sections of the enamel has been a prolific source of discussion in recent years. Of these markings, the fan-shaped figures ordinarily visible when cross-sections of the teeth are examined are the most conspicuous. (Fig. 1.) Since their mention in the literature of over half a century ago, they have been regarded in turn as bundles of circulatory tubules, as artefacts produced by grinding, as defects in the form of uncalcified rods or as uncalcified interprismatic substance. Various descriptive terms, such as "bundles of dark fibers," "whorls" and "tufts," have been applied to them. Douglas Caush (1904) was largely responsible for the prominence to which they have attained.

Except for a limited area encircling the tooth near the amelocemental junction, the tufts are invariably found in cross-sections of teeth. They are readily seen by the novice who views the enamel through the microscope for the first time. The interpretations of their relations to other enamel structures, the discernment of their mode of origin, their course, their exact structure and their biologic significance demand the exercise of all of the resources of the experienced student.

The object of this paper is to call attention to new observations on the structure of the tuft fibrils. The tuft fibril as here understood is one of the threadlike elements contributing to the formation of a tuft unit. Seen in cross-section, the tuft unit, as I have formerly shown,[1] is composed of a linear series of fibrils originating in the underside of the enamel, both the tuft and the fibrils being disposed in parallel rows which run horizontal to the long axis of the tooth.[2] They do not, as taught by Bödecker, originate from a common center. C. E. Allen[3] also conceives of a common origin of the tuft fibrils. He writes, while considering the circulatory tubules, "Another type of bundles of tubules, to which the name enamel tufts has been given, is also formed. It is a larger and bolder type of bundle with a more massive stalk. This stalk is also spiral, and as it passes

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1. Beust, T. B.: Nutrition of Enamel with Reference to Its Susceptivity to Impregnation with Dyes, Dent. Summary, 44:474 (June) 1924. Capillaries of Enamel and Relation to Mottled Teeth, J. A. D. A., 13:980. (July) 1926.

2. Beust, T. B.: Physiologic Changes in Enamel After Tooth Eruption, J. A. D. A., 11: 396 (May) 1924.

3. Allen, C. E.: New View of Microscopic Anatomy of Human Enamel, Australian J. D., 34:1 (Jan.) 1930.

out into the enamel, it unravels into single tubules, as a spiral piece of manila rope unravels." A study of my earlier investigations on this point will show that this version is not consistent with the conditions existing. The observations noted below will also make the fallacy of this interpretation more obvious.

The tuft fibrils spring from the amelodentinal junction. In view of the large number of dentinal tubules found on the enamel side of this junction, I am using the term with the consciousness that the location of the boundary between the enamel and dentin is only vague. From here, the fibrils pass out into the enamel. They leave this region singly, and they lie parallel to one another. They are never twisted.

In this study, very thick cross-sections of molars with adhering morsal enamel were used. Such material furnishes relatively large areas of rod and tuft cross-sections and also permits the tufts to be traced down to their origin.

In the endeavor to picture the tuft fibrils in cross-section, the outcrop of the tuft on the surface of the section was brought into focus. (Fig. 2.) The cut ends of the fibrils pictured through this procedure appear as flat ribbon-shaped structures lying parallel to one another.

Fig. 1.—Stained tufts, injected from pulp cavity.

In my earlier work, I described thorn-like processes projecting into the space between the tuft fibrils.[4] It has now been possible to demonstrate and photograph

4. Footnote 1, second reference.

continuous communications between them. (Fig. 3.) These are not readily demonstrable in all stained specimens, but it appears that they may be regarded as a characteristic feature. The communications probably lie in the varicosities forming the cross striations of the rods. These ladder-like communications make each tuft unit, which is composed of a variable number of fibrils, resemble a ribbon of coarsely woven cloth attached by its basal end to the dentin.

In 1912,[5] I described the lumen of the tuft elements as half-moon-shaped openings partly surrounding the enamel rods. This form of opening may be seen in very young teeth and near the base of the tuft in intensively stained specimens. (Fig. 4.) Here, the lumen of the openings partly surrounds the rod, the rod appearing tinged, which causes it to look darker in the photograph. The three rows of tufts here shown repose on sound dentin. By simply lowering the lens, which removes the focal plane to the underlying structure, the dentin, with its tubular ramifications, may be seen and studied. (Fig. 5.)

Fig. 2.—Section showing three tufts, illustrating shape of cut fibrils.

What is the biologic significance of the tuft? In 1912, I showed that the tufts of recently erupted teeth could be injected from the pulp cavity. Since that time, this experiment has been repeated

5. Beust, T. B.: Contribution to Study of Immunity to Caries, Dent. Cosmos, 54:659 (June) 1912.

by a number of observers. I have furthermore demonstrated that the tufts, together with their supply pipes, the dentinal tubules, gradually cease to conduct stain as the subject grows older. Observations made during a practice of twenty-five years and subsequently have convinced me of the fallacy of the view that changes do not occur in the hard tissues of the tooth after it has once erupted. ceases soon after the functional alinement of the tooth in the occlusal plane. I found furthermore that the cessation of circulation in the enamel is soon followed by a similar phenomenon in many, and not uncommonly all, of the dentinal tubules.

Careful study of the apparent factors in these changes, supplemented by staining experiments, indicates that a tooth

Fig. 3.—Demonstration of communications between tuft fibrils.

This conception, supported by the results of careful study, led to my acceptance of the doctrine of enamel vitality.

My experimental studies of the circulatory mechanism in the enamel, extending over a period of twenty years, have finally disclosed that demonstrable circulation in the greater number of the millions of tufts seen passing into the enamel normally undergoes a transformation in which the colorable interstitial substance, symbolizing the channels of circulation, calcifies. This series of changes may be phrased in the simple statement that "Teeth undergo a maturation process."

Even though we have been familiar with such expressions as "senile teeth," "senile dentin," and "transparent en-

amel," the realization that changes of this nature were common and demonstrable phenomena in the growth of the tooth came as a startling surprise. The matter appears so natural, yet its significance has never before been given consideration by the proponents of circulatory phenomena in the enamel. Because of the revolutionary nature of the contention, I first approached the matter very hesitatingly, forth the facts of the disappearance of the circulation and the mechanism of the severance of the dentinal tubules from the circulatory sinuses of the pulp. It is self-evident that proof of retardation of the diffusion of tissue lymph into the enamel of young adults will withdraw all support from the theories regarding caries which are based on a hypothetical flow of lymph through the enamel.

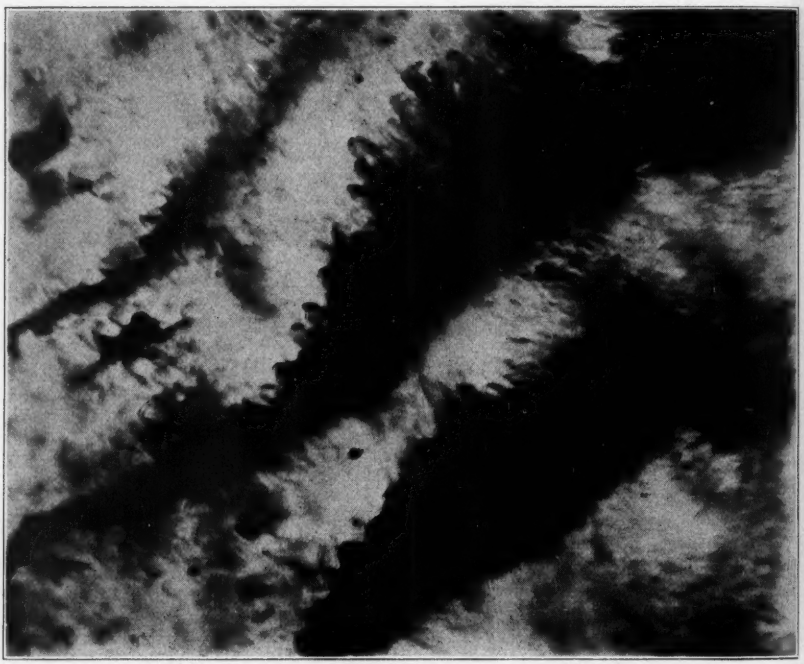

Fig. 4.—Looking down between tuft rows of morsal enamel. The focus is on the surface of the section. Stained semilunar markings, extending partly around the rod, represent the cross-section of the tuft fibril.

yet determined to study it exhaustively, at the 1930 meeting of the American Dental Association at Denver.[6] There, I set

The question of homology of the tufts is a difficult one and I shall limit my remarks largely to suppositions. Should the tufts be regarded as poorly calcified rods? This question must be negated. The tuft fibril is a flat structure always

6. Beust, T. B.: Reactions of Dentinal Fibril to External Irritation, J. A. D. A., 18:1060 (June) 1931.

lying between the rods. Its anatomic arrangement and distribution bespeak a physiologic, not a pathologic, formation. Should the tufts be regarded as homologous with the interprismatic substance? It is not obvious why this should be assumed, except possibly because of their location between the prisms. Interprismatic substance gradually fuses with the prisms. The tuft fibril, on the other hand, is common to only a small percentage of the rods. It always remains a visible unit and never becomes an integral part of the rod, from which it can be isolated with very dilute acids.[7] This indicates that it is made up of a permeable protein substance which later calcifies.

Through the objections urged by J. Leon Williams and Hopewell-Smith, the term "vitality" as applied to the enamel has acquired a dubious meaning. Those unwilling to accept the term may find in the words of William J. Gies, himself an opponent of the conception of enamel vitality, an acceptable substitute. Dr. Gies[8] writes: " . . . it is possible nevertheless that physical (mechanical) transmission of ions and molecules on or in its framework, distinct from physi-

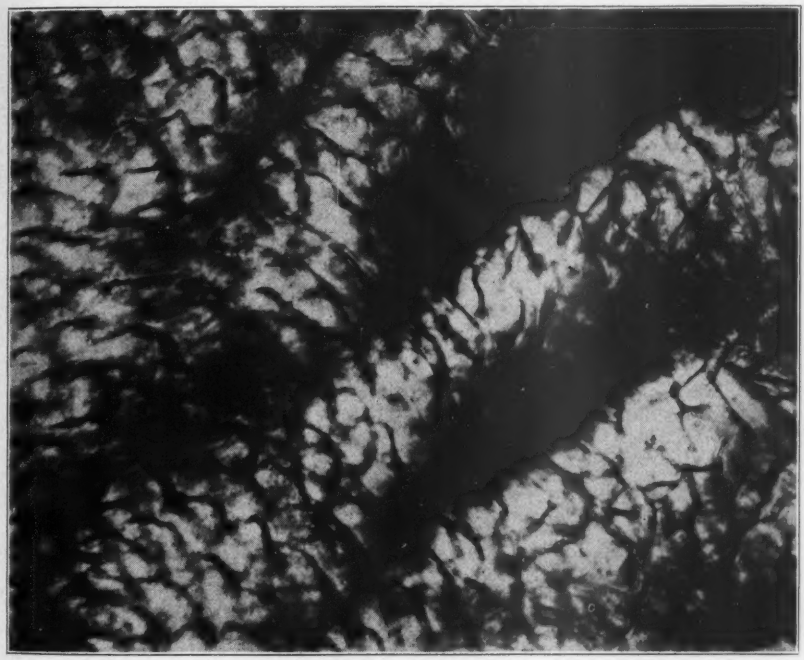

Fig. 5.—Dentin under tufts pictured in Figure 4. The dark bands are shadows caused by the tuft rows. (Photographed from the enamel side.)

7. Beust, T. B.: Intrafollicular Enamel Development, J. A. D. A., 15:2021 (Nov.) 1928.

8. Gies, W. J.: Disc. Hawkins, H. F.: J. Dent. Res. 11:220 (April) 1931.

ological (selective) movement . . . might account for important effects on the enamel."

SUMMARY

Tufts are anatomic structures lying between, but not in, the enamel rods. The fibrils of which they are composed lie parallel to, and are connected with, one another. Collectively, they compose the main circulatory system of the enamel.

An early deposition of matter in the lumen of the tufts renders them impermeable. This change, added to the transformation first described in my paper on "Reactions of the Dentinal Fibril to External Irritation," results in a diminishing of the circulation in the tooth crown. This loss of permeability occurs concurrently with the inception of the state of immunity ordinarily observed in early middle life. This renders those theories of resistance to caries that are based on the action of a buffer afforded by a flow of lymph through the enamel paradoxical and no longer tenable.

A COMPILATION OF STATISTICS ON VINCENT'S DISEASE THROUGHOUT THE UNITED STATES

By I. DISRAELI, D.D.S., Los Angeles, Calif.

AMONG the results of my research work on Vincent's disease is a compilation of statistics concerning conditions throughout the United States. I have been actively engaged in this work and have gathered these statistics from all the offices of the United States Public Health Service, from the dental schools of most of the universities in the United States and from a great number of persons who are engaged in the study of Vincent's disease from a scientific point of view. These statistics have been compiled through the medium of questionnaires, which have been sent out during the last several years. The answers to the last questionnaire were received at my office one month ago. It was composed of seven questions to the Public Health Service, and nine questions to the dental schools of the universities and to the individual dentists. I believe that only the answers to five of these questions would be of interest here. The questions and answers are as follows:

1. *Is Vincent's "angina" on the increase or on the decline?*

Ninety-five per cent of the Public Health Service officers are of the opinion that it is on the increase, and 5 per cent of them gave the opinion that it is on a decline. At the university dental schools, 80 per cent believed that it is on the increase, and 20 per cent on the decline. Of the individual dentists questioned, 90 per cent expressed the belief that Vincent's disease, as a whole, is on the increase; that the acute type is on the decline and the chronic type on the increase.

2. (The second question concerned Vincent's infection, and the answers were practically the same.)

*Read before the Section on Histology, Physiology, Pathology, Bacteriology and Chemistry (Research) of the American Dental Association, Memphis, Tenn., Oct. 21, 1931.

3. *In your opinion, can the disease be spread by public eating and drinking?*

Ninety per cent of the Public Health Service staff maintained that eating places do contribute to the spread of this disease, and less than 10 per cent asserted that these places do not contribute to the spread of this disease. Among the dental colleges, from 75 to 25 per cent asserted that these places are contributing factors, and more than 95 per cent of the individual dentists state that these places are contributing factors in the spread of this disease.

4. (*a*) *Give your opinion as to the method that should be employed to prevent and to eradicate the disease?*

The majority of the answers advocated the education of the members of the healing art, also the public, through publications, radio and the various other means which we have at our disposal for reaching the public.

(*b*) *Do you treat charity patients? If not, where do poor patients get free work?*

The Public Health Service answered that they did not treat such patients, or very few were treated free, and suggested that poor people should obtain free treatment in county or city clinics, and at free dental clinics. Thus far, there are very few states that have free clinics for treatment of Vincent's disease. One-third of the dental schools at the universities suggested the same method of procedure, and some dental colleges reported that they are giving free treatments for Vincent's disease. Ninety per cent of the individual dentists interviewed advocate the adoption of some means whereby poor people may be provided with free treatment and may be educated in hygiene. Thus, this avenue of dissemination would be eliminated and the spread of the acute type of this intractable disease would be lessened.

5. *Would you like to have Vincent's disease made reportable?*

The majority of answers, especially those from the public Health Service, were thoroughly in favor of making this disease reportable, and among the reasons given is that enough statistics may then be available for presentation to the medical and dental professions in order to enlighten them as to the every day increase, and even the prevalence of Vincent's epidemics.

Dr. Box, of Toronto, in the October issue of *Dental Survey,* says: "Necrotic gingivitis is still very prevalent. Its intractable nature is particularly noticed at periodic intervals when it assumes epidemic proportions."

In the September issue of *Dental Survey,* I addressed an open letter to the profession asking them to express their opinion as to the advisability of reporting this disease. Up to date, I have had hundreds and hundreds of answers, the majority of which stated that this disease should be reportable, to insure a proper knowledge as to the condition and to make the dental and medical professions conscious of the intractability of the disease. Also, I found in these letters a demand for recognition, diagnosis and standardized treatment of this disease. From my experience in the past several years, I find that success in this work is dependent entirely on proper recognition, diagnosis and correct treatment in the early stages, and thus the disease may be eradicated in its embryo stage and the spread of it in epidemic form may be prevented. Up to last year, ten states made this disease reportable. Today, there are twelve. Some are reporting cooperation from the dentists; some, the contrary.

In the State of New York, where the disease has been reportable since 1922, statistics show that Vincent's infection

has increased tenfold from 1922 through 1930. The answers from other reportable states are practically identical with the New York report. These statistics are not very accurate, for the dentists do not cooperate with the Public Health Service and do not report the disease.

In Illinois, the disease has been made reportable during this last year. I have been in Chicago during the last two weeks, and, in interviewing about fifty dentists, I found only one who knew about the law. Evidently, the dentists of Illinois have not even been informed of the existing law.

Before I left Los Angeles, I interviewed a great number of Public Health Service officers, who are constantly battling against Vincent's disease. The present condition regarding Vincent's disease in the public schools is not at all satisfactory. Some schools claim that they do not get the proper cooperation from the dental and medical organizations, because of lack of knowledge as to how this obstinate disease should be properly handled. The profession is treating this matter too lightly. Too many fatal cases which have been reported could have been saved had this condition been recognized in its infancy. We have today two other diseases, diphtheria and septic sore throat, that resemble Vincent's infection and that can be differentiated only by microscopic examination. The treatments are different, and if diagnosis is incorrect, the results are very grave.

Allow me to quote a section of a letter from a major in the Dental Corps of the United States Army:

> The medical and dental professions have not come to a full realization of the numerous human ills that are being caused directly or indirectly by Vincent's disease. In an institution of this kind, one has the opportunity for observing the destructive side of this disease and the consequent results.

One scientific man writes that it is high time for members of the healing art to stop and study this disease.

So far, to the best of my knowledge, most of the research work on Vincent's disease has been done by individuals. The research work as a rule should be conducted under the auspices of some institution, and thereby the confusion of many individual efforts be eliminated. I do not think it would be amiss for our main agencies in dentistry to establish a research committee to develop a standard technic for the recognition, classification, diagnosis and treatment of Vincent's disease. It should also investigate such technics as are reported. This committee should be empowered to cooperate with Public Health Service officers and any other agencies that might bring about the eradication of the disease and proper presentation of conditions to members of the healing art. From our experience during the past several years, we have found that the acute type of Vincent's disease can be controlled by preparing ourselves as in any other type of epidemic; but when an acute type of infection is improperly treated, the result is a chronic type of infection, and, in addition, if the patient has a low resistance, a focus of infection is a consequence.

From the foregoing, you will note the importance of the medical and dental professions' availing themselves of opportunities for better knowledge as to the disease, and this can be accomplished only through the medium of research and education.

In view of conditions as shown in this paper, I believe that the American Dental Association should create a standing committee for the study of this subject, to collect data and statistics and develop a more nearly standardized method of diagnosis and treatment.

SCIENTIFIC ATTITUDE IN DENTISTRY

By WILLIAM SCHOENFELD*

SOCRATES, in his discourses, pointed out the futility of argument without a definition of terms. He, an ancient, would have smiled at the ambiguous modern use of the word "science."

Science is the classification of knowledge obtained from the unbiased observation, precise measurement and correlation of phenomena. It implies the use of controlled experimentation from which justifiable conclusions may be drawn, and of prediction on the basis of facts already ascertained.

There has taken place the evolution of a concept known as the scientific attitude. It consists of an outlook that is entirely free from dogma. It provides for the application of scientific principles in accepting new knowledge. It is not skepticism; it is reason.

In the strict sense of the term, dentistry cannot be called a science. In the first place, it deals with human beings, and modern social standards hardly permit the use of human beings as laboratory animals. Secondly, dentistry sets for itself a definite goal: the eradication of disease. Having so well-defined an object is equivalent to having a prejudice, noble in this case, but a prejudice nevertheless. Dentistry might be called an applied science. Undeniably, it does apply in practice the results of purely scientific research. But it is often offered material which falsely professes to be the product of scientific procedure. And, in many instances, such material is accepted.

The dental practitioner should maintain a scientific attitude. He should be eager to accept new information, but he must carefully scrutinize its source, and the methods used in obtaining it. He must reject all matter which fails to survive the test of unbiased critical analysis. He must be willing to discard previously held views when subsequent developments make them no longer tenable.

The discovery of drugs probably dates back to prehistoric times. Down through the ages, men have sought for drugs of all kinds. Some looked for panaceas, others simply wished to find remedies for specific ailments. Every age has had its charlatans advocating nostrums that accomplished nothing, possibly doing actual harm. Our own times, fortunate in the possession of many useful drugs, still witness the use of pharmaceutic substances no more worthy than the oil of puppies or dried alligators of medieval fame. They are produced by persons who seek little more than to capitalize the credulity of their fellow men. Many dentists, too, have been sufficiently gullible to accept such preparations without sufficient proof of their medit. A few instances of successful application do not adequately demonstrate the efficacy of a drug. There must be scientific control. It must be shown that the particular desired end would not have been attained without its use. And this applies to all therapeutic

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agents, mechanical as well as physical and chemical.

Let us consider, not an extreme case, but one such as the use of the ultraviolet irradiation. This pertains, perhaps, more to general medicine than the dental specialty, but its current popularity makes it a timely example. Science has discovered that sunlight vibrations in the range of 2,900 to 3,100 Angstrom units, not within the range of visibility, are capable of curing rickets. These rays, which penetrate fused quartz, but cannot penetrate ordinary window glass, activate a body fat, ergosterol, a portion of which is apparently thus transformed into vitamin D, which, in turn, favorably affects the calcium and phosphorous metabolism of the young human being and enables the organism to form normal bones. The rays may be obtained directly from sunlight or from properly made mercury vapor lamps. They are specific for rickets in human beings. It is also highly probable, though by no means yet scientifically established, that either the ultraviolet or the infrared rays have various other therapeutic effects.

What has taken place? Advertisements have appeared in many medical and dental journals for all sorts of ultraviolet ray lamps. Some advertisements have guaranteed that rays of only 2,300 Angstrom units would cure rickets. Some lamps have given no rays in the required range at all. Some authorities today say that the active lamp rays differ too much from sunlight, that they can alter skin proteins, cause their absorption and produce serious disorders in many cases. Others state that such short rays as the lamps provide are as foreign to the body as poison drugs, and should be used as cautiously. Many conservative physicians will not use these lamps because they feel that they are too little understood to be safe therapeutic agencies. There have been advertisements in the medical journals, however, recommending them for any ailment from asthma to ulcers. In addition, various commercial glasses have been advertised, guaranteeing the transmission of ultraviolet rays from sunlight. But by actual test many of these expensive glasses transmit little more of the radiation than ordinary window glass.

It is necessary to become reconciled to the evolutionary processes that are taking place about us, and which involve us. What the distant future holds for the human race is a matter for speculation, but we have come to hope that science can favorably affect the evolution of man to a higher type. He will dwell in happiness, unencumbered by the evils and maladies that beset us today. And in this change, the high-minded dentist can play an important part.

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C. N. JOHNSON, Editor

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Editorials

THE PREPARATION OF PAPERS FOR DENTAL SOCIETIES

There is no question about the great activity of our dental organizations. Even during the period of economic stress, the attendance at meetings has been phenomenal. Men have traveled great distances to attend meetings and have in many ways inconvenienced themselves materially in their devotion to the upbuilding of the profession.

Dentists are reading dental literature today as they never have before, a matter calling for much felicitation on the part of those most interested in the growth of the profession. Lacking a good flow of literature, the science and art of any calling soon stagnates, and dentistry could not exist very long without its literature.

Therefore, the fact is most apparent that we need good literature, which means that the papers presented before our dental societies should be carefully considered, with respect not only to their scientific findings but also to their literary quality. We believe

that, as the years go on, there is an improvement in the character of the literary output of our dental periodicals, and that this will be more pronounced in the future when we have a larger relative percentage of educated men among our graduates.

Yet it is not solely a matter of education to produce good dental literature. Many of the men who are presenting papers for our societies today could furnish a much more creditable quality of literature than they do if they would devote a little more care to preparation. We do not expect an essayist to produce a classic every time he prepares a paper, but he at least owes it to his profession to write ordinarily good English and to express himself clearly and intelligently, so that the reader may not be obliged to labor unnecessarily to grasp his meaning. An old saying has it that "easy writing makes hard reading," and there is more hard reading than is necessary when we consider the average intelligence of our writers of today.

For the most part, this is a matter of carelessness or indifference, a lack of application to the task in hand. In other words, many of our essayists do not write so well as they might if they would only take a little more pains and accept their obligation a little more seriously. Too many papers are thrown together at the last moment instead of being carefully planned in advance and arranged in orderly fashion. Above all, a man to write intelligently must first think intelligently; and he must be thoroughly imbued with his subject. If we are to produce a dental literature worthy of the name, there must be a general toning up of the mental processes of our essayists and a deeper devotion to the task in hand.

It would probably be surprising to most essayists if a critical analysis were made of their papers as they are turned into the editorial office. At one time, a test was made of this very thing. A paper was selected at random from the program of a large and representative society, and with all identification marks eliminated, was submitted to two men with a request for their opinion of the paper. Neither critic was to know that anyone else was reviewing the paper. The reviewers were young men in the profession, not

hardened veterans of the blue pencil, and the paper was written by a man of high standing in the profession.

The result was illuminating. Space will not permit a full review of the two opinions, but a few extracts may serve to give an indication of the impressions made on the critics.

One man said:

> I can hardly imagine your publishing this article. Whoever wrote it seems to have the worst notion of organization possible. It was obviously written to be presented orally, not printed, but even so I am tempted to believe it was taken down stenographically as it was extemporized from half-baked notes. The English and sentence-structure, though atrocious, could be readily smoothed out, but the organization of the entire paper is so wretched that it would have to be torn down entirely and rewritten. And even so, there seems to be nothing new, either in material or viewpoint, nothing worth writing about. The man seems to have read widely rather than wisely, and readily confuses new lines of thought with old ones. . . .

The other critic said, in part:

> When the paper is viewed in toto, I consider it a personal estimation of work done by others, with little or no original contribution by the author. . . . I have found the article to be too diffuse, to lack logical procedure in its development. There is some doubt as to the actual definition of terms, which is the first requisite of any intelligent discussion. . . . Some of the sentences are so involved that they are left literally without meaning because of the confusion.

Examples are given that amply prove without cavil the contention of the reviewer. He sums up: "The subject matter is not highly original, not backed with sufficient evidence, not presented definitely enough. . . . There is nothing of vital importance or interest to the general practitioner."

Please permit us to recall the fact that the author of this paper was supposed to be a man of considerable note in the profession. The presumption is that he had the ability to write a much better paper than he did, because we are forced to admit that the opinion of the two reviewers was perfectly justified.

What, then, is the lesson? Simply this, that our essayists must exercise more care and give more study to the preparation of their papers if we are to have a literature that shall reflect credit on our profession. The issue is strictly up to our writers, with this added plea, that when such a paper as we have just noted is smoothed out in the editorial office and made presentable for publication, the author will considerately refrain from descending on the staff with

all sorts of charges to the effect that his paper has been mutilated and ruined. If all papers were permitted to appear without change, there would be much mutilation and plenty of ruin.

IT TAKES ALL KINDS

We are reproducing herewith an answer by Mr. George Eastman made to a critic who was disgruntled over some of Mr. Eastman's philanthropies. The following is taken from the daily press:

IN REPLY TO SOUTHERN CRITIC
GEORGE EASTMAN TELLS WHY
HE HAS BUILT DISPENSARIES

Explanation in his own words of the reasons for his founding of dental dispensaries in Rochester and foreign capitals is given by George Eastman in a letter made public for the first time last night in a speech by Dean Carl W. Ackerman of the Columbia School of Journalism in New York City.

Mr. Ackerman, who is the author of a biography of Mr. Eastman published two years ago, made the letter public in an address before the Men's Class of the Riverside Church at the Commodore Hotel in New York. It was written in response to a letter from a correspondent in West Virginia, who criticized Mr. Eastman for not concentrating his philanthropies on other causes.

WEST VIRGINIAN ASKS QUESTIONS

"In 1929," said Mr. Ackerman, "Mr. Eastman gave the City of Rome one million dollars for the establishment of a dental clinic for Italian children. It was one of several similar gifts to European communities. The publication of this item in the press of West Virginia caused a debate in the Men's Bible Class of a certain church and the secretary and teacher wrote Mr. Eastman, as follows:

" 'The result of this debate was that men like you and Mr. Blank are the greatest stumbling block to a poor man living a Christian life.

" 'This church is made up of poor working men. I will cite myself as to what poor means. American—42 years old. Family of 6. Work 7 days per week, no vacation. $1,500 mortgage on home. $400 doctor bill. Wife and part of children won't go to church on account of poor clothing. Three children need tonsils removed, no money. Family needs $200 dentist work done, no money. Bills to pay, no money.

" 'The questions I was requested to ask you are as follows:

" 'If you were poor and saw a rich man throwing money away, would it make you doubt God's justice?

" 'Are you a member of any church? (Let God decide the Christian part of it.)

" 'If you have money to give away, why not give it to the spreading of the gospel of Christ?

" 'Why not pay it to your workers in wages?

" 'But if you cannot do either, why give it to a nation like you did? Why not give it to your country where you made same?

" 'I told the class you would not answer. Will you?

" 'Yours for America first.

(Signature)

" 'P. S. Loan on this church of $8,000.' "

MR. EASTMAN REPLIES

"Mr. Eastman," Mr. Ackerman said, "replied to this letter, not because of his own feelings, but because of his sense of social responsibility." His reply follows:

" 'Permit me to say that I can understand your present anxiety and the problems which confront you. I had to leave school before I was 14 years old because I was the only wage earner in the family. When I was a young man I had to work 11 hours a day in a job which I considered drudgery. By the time I reached your age I had large obligations and responsibilities because I felt a personal responsibility for the welfare of thousands of families in this country and Europe who were dependent upon the success of this company for their livelihood and, in a measure perhaps, for their happiness.

" 'You state that you have four children. These children face an entirely different future from that which confronted the children of this country 60 or even 70 years ago when I was a boy. In those intervening years we have had the telephone, the electric light, the street car, the motion picture, the automobile, free public libraries, cheap railroad transportation, excellent daily newspapers and the development of public school, college, and university education which makes it possible for every child to obtain an education. In the meantime, too, the progress of medical and dental science and the improvement in public health enable every citizen to benefit by the labor and the generosity of men and women who have thought more of their fellow citizens than of themselves.

CHILDREN WILL BENEFIT

" 'In the building of industry and transportation in this country some men have accumulated great wealth. In most cases, these men have given to education, to the church or to some agency serving the public a far greater proportion of their wealth than they ever used themselves. So that in addition to raising the economic standard of the country, men like John D. Rockefeller, Cleveland H. Dodge, Jacob Schiff, Julius Rosenwald, Andrew Carnegie, and scores of others have improved the social life of our country.

" 'What these men and what other rich men and women have done and are doing will most certainly benefit your own children.

" 'Because you condemn me for a gift to the people of Italy and because you mention the fact that your own family needs "$200 dentist work," I want to acquaint you with a few facts that you do not have. I regret that you did not seek to acquaint yourself with these facts before you held your debate because you handicap yourself, your children, and your community by disregarding them.

INCEPTION OF DISPENSARY

" 'About 15 years ago a man by the name of Forsythe in Boston conceived the idea of establishing a dental infirmary where the children of that city could obtain expert dental treatment free of charge. The idea appealed to me and I established a dental dispensary in Rochester for all indigent children under 16 years of age. Since this dispensary has been opened the children of this city have received more than one million dental treatments free of charge.

" 'The success of this institution convinced me that there should be similar dispensaries throughout the United States and Europe, and I decided to found one in London and one in Rome, because I was convinced that as the idea spread, other men and women would undertake to build, equip, and endow dispensaries in other cities. Since then Mr. Rosenwald has undertaken the work in Chicago and Mr. and Mrs. Murray Guggenheim in New York City.

" 'Now there should be such an institution in your community in West Virginia, and in every city in this country. They should be built and operated by government money, but until that time comes when the government can do the work, men and women of wealth must carry on.

RECOMMENDS CONSTRUCTIVE POLICY

" 'Therefore, instead of denouncing the building of dental dispensaries I would recommend that your Bible class undertake the more constructive policy of striving for a similar agency in your community.

" 'As to the religious questions in your letter, I should like to call your attention to the Constitution of your country, which guarantees to every American citizen complete religious freedom, without being accountable to any man or any Bible class for an explanation of his Faith.

" ' "Whatsoever a man soweth, that shall he also reap. . . . Let us not be weary in well doing; for in due season we shall reap, if we faint not."

" 'Yours very truly,

" 'GEORGE EASTMAN.' "

We submit the suggestion that Mr. Eastman has in a quiet, unassuming, modest and altogether logical way disarmed his critic completely. The pity is that men can find it in their hearts to censure a man for doing one of the noblest acts of which a generous

philanthropist is capable, and it is the mark of a very great man when the censured one can accept it all in such a gracious way and without any apparent resentment. It is hard enough for a man to suffer criticism under any circumstances, but it is doubly so when the critic directs his shafts at an unselfish and wholly praiseworthy achievement which, in the very nature of things, was intended only for the good of humanity.

It was a fine thing for Mr. Eastman to give so generously for the welfare of the poor and the needy in different parts of the world where help was needed, and we cannot help thinking that it was just as fine for him to accept in such a splendid spirit a stricture passed on him for what was so manifestly a noble service.

RULES REGARDING EDUCATIONAL PUBLICITY

At the meeting of the Board of Trustees on Thursday, October 22, a resolution was passed empowering the Board to create a committee on educational publicity as part of the Bureau of Public Relations. The resolution also provided for the drafting of rules and regulations in the conduct of the activities of this committee.

After the meeting of the House of Delegates, the Board of Trustees met and created the Committee on Publicity, and authorized this Committee to perfect working plans, and report to the Ad Interim Committee or Board of Trustees.

The purpose and plan of the Educational Publicity Committee had already been outlined to the Board of Trustees, and the Committee proceeded to effect the rules along the lines that had been indicated to the Board of Trustees.

At the meeting of the Board of Trustees held in Chicago, January 18, the Educational Publicity Committee presented the following plans:

1. The Committee shall adopt the use of educational messages according to a plan approved by the Judicial Council at the Memphis meeting. The Committee shall pass upon copy submitted by

advertising agencies and this copy may be used by local dental societies. The Committee has under contemplation the preparation of educational messages which shall be released directly to the local societies for their use.

2. The Committee contemplates the employment of a publicity director who shall supervise publicity matter as relates to the American Dental Association. This publicity director shall prepare copy which shall be passed upon and approved by the Publicity Committee before being sent to the various newspapers or other news disseminating mediums.

3. The Committee advises the use of the radio by the American Dental Association and by state and local societies for the dissemination of oral, dental and general health topics, the subject matter to be approved by the proper committee of the American Dental Association or state or local society.

The report was accepted and adopted. The Board of Trustees also ratified the work which had been done by the Committee previous to that date.

The officers of the constituent and component societies of the American Dental Association are being notified by the Secretary's office of the official action taken. This is being done because certain societies have contended that the work and plan of the Publicity Committee did not have the approval of the Board of Trustees.

A careful analysis of the plan indicates that three different methods of educational publicity are contemplated.

1. Educational messages based on the plan used in Little Rock and which have already been adopted by various societies all over the United States are to be employed. This plan was approved by the Judicial Council at the Memphis meeting. The Publicity Committee believes that the educational messages have a value that cannot be replaced by any other means.

The Committee does not intend to force this plan upon any of the constituent or component societies, it being left for the society to adopt the educational messages if it believes that they

will be useful in creating an appreciation of dental health in the particular locality.

The Committee does not try to suggest or request that any constituent or component societies use any particular type of educational messages that may be submitted to them by various agencies or newspapers. All the Educational Publicity Committee requests is that such copy as is used be submitted to the Committee for its approval in order that no misleading or conflicting statements shall appear in the messages.

2. Since the meeting of the Board of Trustees in January, the Educational Publicity Committee has completed arrangements for the employment of a publicity director. The purpose and plan of the publicity director's work were outlined at the State Officers' Conference and seemed to have the approval of everyone present.

3. The third portion of the report deals with the use of the radio for the dissemination of oral hygiene messages and information. Various constituent and component societies have been using the radio. Certain societies have been able to show definitely that the public is listening to these health messages.

It has been proved that more than 70 per cent of the American public do not visit the dentist at regular intervals. The Committee believes that if these various educational plans are followed, much will be accomplished toward educating this 70 per cent of the people to appreciate oral health service.

M. D.

DEATH OF DR. J. LEON WILLIAMS

As we go to press, word is received of the death of Dr. J. Leon Williams, February 22. An extended notice will appear in the April issue.

COUNCIL ON DENTAL THERAPEUTICS

ACCEPTED DENTAL REMEDIES

The following articles have been accepted as conforming to the rules of the Council on Dental Therapeutics of the American Dental Association for inclusion in the list of Accepted Dental Remedies. The Council desires to point out that admission of an article does not imply a recommendation. A copy of the rules which govern the Council in the consideration of articles will be sent on request.

SAMUEL M. GORDON, *Secretary*

NEO-SILVOL.—Colloidal silver iodid compound.—A compound of silver iodid with a soluble gelatin base containing from 18 to 22 per cent of silver iodid in colloidal form.

Actions and Uses: Neo-silvol, even in concentrated solutions, causes neither irritation of mucous membranes nor coagulation of albumin. It does not stain the skin.

It is maintained that neo-silvol, in laboratory tests for germicidal value, has been found as effective as phenol in its action on bacteria.

Neo-silvol is intended for the prophylaxis and treatment of infections of accessible mucous membranes and is said to be indicated in infections of the eye, ear, nose and throat.

Dosage: In the treatment of acute inflammations of the mucous membranes, solutions of neo-silvol as strong as 50 per cent can be used. For irrigating sinuses, from 2 to 5 per cent solutions are used.

Solutions of neo-silvol are prepared by adding the substance to the required amount of water and agitating the mixture until solution occurs.

Manufactured by Parke, Davis and Co., Detroit, Mich. U. S. patent and trademark applied for.

Capsules Neo-Silvol, 6 grains.

Neo-Silvol is prepared by heating freshly precipitated silver oxid with gelatin (which has been previously dissolved in a dilute alkaline solution) until the silver oxid has been reduced to metallic silver in a colloidal state of subdivision. The solution is treated with iodin, which combines with the silver. The liquid is then evaporated to dryness *in vacuo*. The finished product contains from 1 to 3 per cent of combined iodin in excess of that required for combination with the silver.

Neo-silvol occurs as pale yellow granules. In concentrations up to 50 per cent, neo-silvol forms with water almost colorless, milky or opalescent solutions (colloidal suspensions). Neo-silvol is insoluble in fixed oils, but slowly soluble in glycerin. Solutions of neo-silvol are not precipitated in the cold by strong acids or sodium chlorid.

SILVOL.—A brand of mild silver protein, U. S. P. Silvol is a compound of colloidal silver with an alkaline proteid.

Action, Uses and Dosage: The same as for mild silver protein, U. S. P.

Manufactured by Parke, Davis & Co., Detroit, Mich. No U. S. patent or trademark.

PLOUGH'S TOOTH PASTE.—Each 100 gm. contains calcium carbonate, precipitated, 32 gm.; magnesium carbonate, 3.5

gm.; soap, 5.6 gm.; glycerin, 30 gm.; water 26.6 gm.; saccharin, 0.06 gm.; flavoring, 1.8 gm.; Indian gum and Irish moss, each, 0.3 gm., and coloring.

Claims: The manufacturer has agreed to make no claims except that it is an effective cleansing agent.

Manufactured by Plough, Inc., Memphis, Tenn.

GLYCERIN IN TOOTH PASTES

The Council has authorized publication of the following statement.

SAMUEL M. GORDON, *Secretary*

Inquiries have been received by the Council regarding disparaging statements which are made by some manufacturers of tooth powders against the presence of glycerin in tooth pastes. These disparaging remarks are made notably by August E. Drucker Company of San Francisco, Calif., makers of Revelation Tooth Powder, and by the R. L. Watkins Company of Cleveland, Ohio, manufacturers of Dr. Lyon's Tooth Powder.

Advertising for Revelation Tooth Powder (August E. Drucker Company, San Francisco, Calif.) states, "Injurious substances—as glycerine—should not be incorporated in the manufacture of a dentifrice. . . . Glycerine is a depletent, it saps the moisture from the tissues, which naturally will recede exposing the periodontal membrane. This moisture in the cellular tissue is essential to the healthy condition of the membrane."

Advertising for Dr. Lyon's Tooth Powder (R. L. Watkins Co., Cleveland, Ohio) states, "Dr. Lyon's contains no glycerine. Therefore does not soften the gums."

The impression gained from reading both of these statements is that glycerin does soften the gums.

Glycerin is an ingredient of practically all tooth pastes marketed at the present time. The Council holds no brief for manufacturers of tooth pastes, for in the view of the Council the marketing of tooth pastes and tooth powders is essentially an undignified trade war, although there has been some improvement in the situation in the last few years. The Council is deeply interested in the matter of the apparent misinformation which is implied in these statements as far as the dental profession and the public are concerned. The result of such advertising, the Council holds, is that the dentist and his patient are confused and they are consequently led to believe that glycerin should be avoided in the manufacture of tooth pastes.

There appears no adequate experimental or clinical evidence to warrant the statement made by many tooth powder manufacturers that glycerin is injurious to the tissues of the mouth. It is true that concentrated glycerin extracts water from certain tissues under certain conditions, but it is highly improbable from the manner in which tooth pastes are ordinarily used and from the amount of glycerin contained in the quantity of tooth paste employed at a brushing that apparent harm can result. Roth, in an investigation on kataplasma kaolini, has shown that glycerin does not abstract water from the intact skin. (*J. A. M. A.*, June 1, 1927, page 1875.)

Unless the advertiser brings forth adequate experimental evidence to verify such statements, their use should be considered as an unfair trade practice, confusing not only the dentist but also the public. Such statements as those to which reference is made are, in general, in line with the unsavory tooth paste exploitation of the last few years. Competitors' goods are disparaged, while the advertiser's goods are praised to the sky, all without evidence that has been submitted to competent authority.

The Council suggests that until tooth paste and tooth powder manufacturers get together and agree on a set of trade practices guided by the definition of the Council for dentifrices; viz., that the dentifrice is an agent which may aid the toothbrush in cleaning the surfaces of teeth, this undignified type of advertising, so prevalent in this field, will continue only to the discrediting of advertisers in general and to the confusion of the public, which, in the last analysis, is the Council's concern.

CAMPHO-PHENIQUE—NOT ACCEPTABLE FOR A. D. R.

The Council has authorized publication of the following report.

SAMUEL M. GORDON, *Secretary*

Campho-Phenique (The Campho-Phenique Company, St. Louis, Mo.) is advertised in some dental journals, and is also on the drug lists of some dental schools.

No statement of composition appears on the carton or on the principal label of the package. Advertising states:

Campho-Phenique not Secret but Cannot be Counterfeited.

Campho-Phenique is not secret. Its principal constituents are Phenol, Camphor and a neutral hydro-carbon oil. The precise quantities and the exact chemical methods necessary to combine these agents as they are exhibited in Campho-Phenique is, however, a secret, and although hundreds of substitutes have been offered to physicians and surgeons none have stood the test of clinical use.

Campho-Phenique belongs to the group of patent medicines; that is, a preparation the formula for which is secret, and which can be purchased directly by the public for such self-medication as they wish to carry out without professional advice. Campho-Phenique is stated in the advertising to have a wide range of usefulness and to be ideal in all incisions and excisions as an antiseptic. Campho-Phenique is further stated to be the result of many years of research by scientists, until ". . . physicians and surgeons now have in Campho-Phenique an exhibition of Phenol of unimpaired effectiveness, yet deprived of its disagreeable and dangerous attributes."

Campho-Phenique is stated to be the dentist's chief dependence, and "is well nigh indispensable in the dentist's office."

Campho-Phenique is stated to have stood the test of time. "Hundreds of substitutes have waxed and waned since it first was offered to physicians, surgeons, and dentists, yet each succeeding year finds it more firmly established in the esteem of the allied professions."

The foregoing statements as to composition and claims are interesting in the light of the published information on Campho-Phenique. About 1907, that is, two

years after the formation of the Council on Pharmacy and Chemistry of the American Medical Association, Campho-Phenique was stated to be composed of phenol, 49 per cent, and camphor, 51 per cent. Examination by the Council on Pharmacy and Chemistry of specimens purchased in the open market showed that statement of composition to be untrue, the analysis of that Council showing that Campho-Phenique, instead of containing 49 per cent of phenol, contained only 20 per cent, and instead of 51 per cent camphor, only 38 per cent, and liquid petrolatum to be present in the amount of 38 per cent or more. (*J. A. M. A.*, April, 1907, p. 1365; also "Propaganda for Reform," Vol. I, Ed. 9, p. 40, and Vol. II, p. 418, published by the American Medical Association.)

In commenting on the report of the Council on Pharmacy and Chemistry, the editor of the *Journal of the American Medical Association* pointed out why physicians could not get druggists to make preparations which were as "satisfactory" as those which could be bought ready-made; a remark unthinkingly made by a few dentists today, and fostered by some manufacturers of proprietary preparations. Physicians wondered why their druggists could not duplicate the formula of Campho-Phenique on the basis of the composition given by the company. The report of the Council on Pharmacy and Chemistry explains why.

The editor of the Journal of the A. M. A. also pointed out that the owner and controller of the Campho-Phenique Company of St. Louis was also the principal owner of a number of patent medicine concerns, the Ballard-Snow Liniment Company, Brown's Iron Bitters Company, Mayfield Medicine Manufacturing Company and several others.

As Campho-Phenique is still being advertised to the dental profession and is used in some dental schools, it was felt desirable to make an examination of the product sold in 1931. This shows that the formula has again been changed and that Campho-Phenique of 1931 is essentially a solution of 5 per cent phenol and 20 per cent camphor in liquid petrolatum, a mixture which can obviously be prepared by anyone with the slightest knowledge of drugs. This to the contrary of the statement in the advertising that "the precise quantities and the exact chemical methods necessary to combine these agents as they are exhibited in Campho-Phenique is, however, a secret."

In the light of the foregoing, one wonders how to interpret the statement ". . . hundreds of substitutes have waxed and waned since it (Campho-Phenique) was offered to physicians. . . ." Admitting for the moment that a solution of phenol and camphor in petrolatum was original with the Campho-Phenique Company in 1907, one might raise the question as to whether Campho-Phenique of 1931 is not a substitute for Campho-Phenique.

Here is demonstrated one of the evils of the proprietary medicine business, the irrationality of prescribing *names* rather than *drugs*. If a dentist wishes to use or prescribe a solution of phenol and camphor in liquid petrolatum, no one can dispute his right, but to prescribe a name under the impression that the product covered by the name has not been changed not only confuses him but also is unfair to him or to his patient. The company retains its name, although changing its formula.

REPORT OF BUREAU OF CHEMISTRY

The report of the A. D. A. Bureau of Chemistry follows:

Three (3) original packages of Campho-Phenique (Campho-Phenique Co., St. Louis, Mo.) were received for examination. Each package consisted of a bottle of liquid, enclosed in a carton and accompanied by a circular. The following appeared on the label:

Campho-Phenique. Non-irritant antiseptic dressing. Indicated in operations in major and minor surgery. Prepared only by Campho-Phenique Co., 500-502 N. Second St., St. Louis, Mo.

The following appeared in the circular:

Campho-Phenique is not a secret. Its principal constituents are Phenol, Camphor, and a neutral hydro-carbon oil.

The precise quantities and the exact chemical methods necessary to combine these agents as they are exhibited in Campho-Phenique is, however, a secret, and although hundreds of substitutes have been offered to physicians and surgeons none have stood the test of clinical use.

Each bottle contained approximately 112 c.c. (3.8 fluid ounces) of a light straw-colored oil, possessing a predominating camphor odor and a bitter, burning taste.

The contents of the three bottles were bulked for examination. The specific gravity of the oil was 0.866 at 20 C. and the refractive index 1.4655 at 20 C. The oil was practically insoluble in water, approximately 4 per cent soluble in 10 per cent sodium hydroxid solution, and approximately 25 per cent soluble in cold concentrated sulphuric acid. The original oil was partially miscible with 95 per cent alcohol and with 70 per cent alcohol, the two liquids being mutually soluble in both cases. The oil burned with a smoky flame when ignited, leaving no residue.

Elementary qualitative analysis indicated the absence of halogens, nitrogen and sulphur. Qualitative tests indicated the presence of phenol, camphor and a paraffin oil possessing the properties of light liquid petrolatum.

Quantitative examination yielded the following:

Phenol (C_6H_5OH)	4.7%
Camphor ($C_{10}H_{16}O$)	19.6%
Liquid petrolatum	72%

Based on the foregoing, it may be calculated that the essential composition of Campho-Phenique may be expressed as follows:

Phenol, U. S. P.	5%
Camphor, U. S. P.	20%
Liquid petrolatum, U. S. P.	75%

In view of the foregoing, the Council declares Campho-Phenique inadmissible to A. D. R.; i. e., because a statement of composition is not given on the label (Rule 1); tests to determine the constancy of the constituents are not furnished (Rule 2); it is marketed with unwarranted therapeutic claims (Rule 6); the principal label does not state the amount of phenol, a potentially poisonous substance (Rule 7); the name is objectionable because the Council cannot admit to A. D. R. under a proprietary name a simple solution of pharmacopeal substances (Rule 8).

CALSODENT—NOT ACCEPTABLE FOR A. D. R.

The report of the Council holding Calsodent not acceptable for A. D. R. was forwarded to the Calsodent Company on three different occasions, the last in the early part of January, 1931, by registered mail. No reply to the report of the Council has been received from the Calsodent Company.

The referee on Calsodent again took up consideration of Calsodent, amplifying the report sent to the Calsodent Company, and the Council authorized the publication of the following report.

SAMUEL M. GORDON, *Secretary*

Calsodent was presented to the Council by the Calsodent Company, New York, for inclusion in the list of acceptable remedies.

According to the Calsodent Company, the name Calsodent is coined from the words calcium-sodium dentifrice, and is made up as follows:

Sodium chlorid		1 pound
Calcium oxid		100 grains
Ammonium carbonate		8 grains
Congo red	"Indicator"	3 grains
Phenolphthalein		8 grains
Saccharin		24 grains
Aromatics		80 drops

Converted into percentage terms, using apothecary equivalents, the composition may be expressed: sodium chlorid (salt), 97.6 per cent; calicum oxid (lime), 1.7 per cent; ammonium carbonate, 0.1 per cent; congo red, 0.05 per cent; phenolphthalein, 0.1 per cent; saccharin, 0.3 per cent; plus aromatics.

The foregoing formula is essentially the one for which a patent was granted in 1929 to John Oppie McCall, D.D.S., New York City, as a "means for and method of detecting and correcting mouth acidity," and which was assigned to the Calsodent Company. Except for the indicators, the formula is essentially the same as one accredited to Hermann Prinz, D.D.S., by Fones in 1927 ("Mouth Hygiene," p. 293). From the foregoing, it is apparent that Calsodent is essentially salt, which has been slightly modified by the addition of small amounts of lime and other substances. The formula of Calsodent varies from the formula published in textbooks principally in the addition of small amounts of the two indicators. The claims for Calsodent in large part rest upon the presence of the indicators.

The advertising issued in connection with the sale of the product includes Calsodent as part of the "Modern Periodontic Treatment." The following statements appear:

A delicately balanced combination of alkaline ingredients, which will neutralize mouth acid rapidly and completely, yet with perfect safety.

A combination of indicators especially adapted for detecting mouth acidity.

A combination of therapeutic agents, which gives a mild but definite stimulation of the flow of saliva.

It will stimulate the circulation of the blood and lymph even when used as a mouth wash.

It will relieve sensitiveness of the neck of the tooth by neutralizing acid which is the usual cause of sensitiveness.

All of these represent definite statements for which evidence was not made

available by the company to the Council. Reduced, the claims for the product are that it is: (1) An "indicator" to indicate "acid mouth." (2) An alkaline wash to neutralize "mouth acidity." (3) An agent to remove mucin from tooth surfaces.

The evidence for the usefulness of the mixture of indicators to detect "mouth acidity" submitted by the Calsodent Company was not convincing, consisting of generalities, which could not be considered to show that mouth acidity was detectible by this means. No evidence was presented regarding the shades of color that might be expected at different degrees of acidity, nor was evidence presented that the two indicators act as complementary indicators and not independently. In any event, the acidity of the mouth, if at all determinable by this indicator, can be considered of no consequence in the hygiene of the oral cavity, until more convincing evidence than what appears to be psychologic appeal is presented.

Detailed directions in circulars state that the use of the product when the mouth is acid causes the red color to fade; it does not fade when the mouth acid is neutralized. What this means in the hygiene of the mouth is not clear. It is hardly necessary to point out again that the available evidence indicates clearly that the reaction of the saliva cannot be controlled by the ingestion of acid or alkaline materials. Yet the claim is made that if acids are present, the preparation detects and corrects it; no evidence being submitted for a claim contrary to well established information. Indeed, one wonders how the very small amount of alkaline substances as calcium oxide and ammonium carbonate in a solution prepared according to the directions will neutralize mouth acids, or why it should be neutralized when normal saliva ranges in acidity over a relatively wide range. Again McKinstry and Carlson (*D. Cosmos,* 66:850, 1924) pointed out that the ingestion of 10 c.c. of saturated lime water did not appreciably affect the measurable p_H of the saliva. In view of the claim of the Calsodent Company that Calsodent detects and neutralizes acid mouth, evidence beyond general or theoretical statements should be presented to the profession to show the desirability or the ability to influence the reaction of the saliva for more than transitory periods.

The claim that Calsodent removes mucin is not supported by carefully controlled evidence. The Council desires to point out that while it has been common belief that mucin contributed to the formation of bacterial plaques in the mouth, recent work by Goldsworthy and Florey (*Brit. J. Exper. Path.,* 11:192. 1930) indicates that mucin has some antibacterial action. Hence, the term "mucin" and the limitations of Calsodent in removing this should be more carefully outlined and supported by adequate evidence.

In view of the foregoing, Calsodent is declared to be an unessential modification of salt. No evidence has been presented that it is more useful than a mouth wash of salt to which a dash of lime water is added. The name does not indicate the important ingredient, which is salt.

The Council cannot admit Calsodent to A.D.R. because it is an unessential modification of salt (Rule 10); it is marketed with unwarranted therapeutic claims (Rule 6), and the name does not inform the user that salt is the main ingredient (Rule 8). The claims made by Calsodent go beyond those permitted by the Council for its consideration as a dentifrice, as decided therapeutic claims are made in its promotion.

BUREAU OF PUBLIC RELATIONS

AMERICAN DENTAL ASSOCIATION TO BROADCAST

THE Bureau of Public Relations has been able to complete arrangements with the Columbia Broadcasting System for a five minute period once a week. The original broadcast will be made from Station WBBM in Chicago and will go out over a hook-up of approximately forty stations. The time of the broadcast is to be each Wednesday between 12:00 m. and 12:05 p.m., centarl standard time. This will bring it to the sections of the country having other than central time at the following periods: eastern time, 1:00 to 1:05 p.m.; mountain time, 11:00 to 11:05 a.m.; western time, 10:00 to 10:05 a.m.

This arrangement will give organized dentistry an excellent opportunity to carry an authentic message on oral hygiene into many sections of the country. The fact that this period is a part of the "Farm Hour" makes it possible to reach a large rural population, which is not too frequently brought in contact with information on the care of the teeth.

The offer of this broadcasting period comes entirely through the generosity of the Columbia Broadcasting System and is without any expense to the Association. The privilege is good for as long a time as the Association desires to make use of it, and is governed only by the continuance of the "Farm Hour." It does not appear that this hour will be given up at an early date.

In order that the greatest good may be realized from this great opportunity, it is suggested that members of the profession "listen in" regularly. *If at any time a member has constructive criticism or a suggestion to offer, it is desired that it be sent to the Bureau of Public Relations of the Association.* By so doing, members will make possible the development of an effective broadcasting program and one of which every Association member will be justly proud.

It is further suggested that each Association member call this broadcasting period to the attention of his patients and urge them to listen in regularly. The larger the audience that can be developed to follow these broadcasts, the greater will be the good influence exerted by them.

It is needless to say that this generosity on the part of the Columbia Broadcasting System is deeply appreciated. Too long has the public listened to the dental messages broadcast by commercial interests alone. We feel certain that this offer was made with the realization and appreciation of the need for broadcasting authentic and practical information on the care of the teeth, untinged by mercenary or commercial motives. It is furthermore a recognition and an evidence of confidence in organized dentistry. Every effort will be made to justify that confidence.

DENTAL HEALTH EDUCATION IN LOUISIANA

By Leo J. Schoeny, D.D.S., New Orleans, La.

THE question of dental health education occupies a prominent position in the deliberations of ethical dental organizations throughout the country today. There is little doubt that our profession recognizes the need for reaching the public with true facts pertaining to dental health, but we appear to be divided as to the manner in which this should be brought about. One group favors the plan of disseminating such knowledge through the schools and through such organizations as parent-teacher associations, women's clubs and other civic bodies. We also have the group which believes that the ethical dental organizations should enter into an extensive newspaper advertising campaign.

This is a serious problem. It is serious because a wrong step may not only fail in its purpose, but may also actually break down, or at least jeopardize the present high standing as a profession which it has taken us so many years to attain. We enjoy the respect and confidence of the medical profession and of the laity. Year by year, through our conscientious efforts, we are making ourselves more valuable in the scheme of preventive medicine. We have condemned a certain type of newspaper advertising and the public has finally developed a sense of distrust and repulsion toward it. It will be difficult for many to understand our change of heart in this respect, and few will really appreciate the difference between the character of our educational messages and the copy being run by the unethical advertiser.

It is my opinion that much more real good could be accomplished with a program carried on in the schools and before civic groups by the dental profession and by our departments of health and education. For the benefit of states or communities contemplating such a program, I shall outline "Louisiana's Five Year Dental Health Educational Program." While primarily educational in character, we felt it would fall far short of its purpose if provisions were not made for the indigent children of our state. Therefore, the members of our state society have volunteered to devote one hour each week to free work in such cases, in addition to contributing their part in the educational phase of the program.

The program is carried out by the state health department, state educational forces and the state dental society's own working agencies. The state dental society's forces consist of the state society bureau of dental health education, which directs the campaign; of all members who have signed the volunteer card; one dentist of each county appointed by the bureau as county dental health supervisor, and such assistant or community supervisors as may be appointed by the county dental health supervisor in conformity with local requirements. The county dental health supervisor is responsible for the success of the program of his county. He distributes to his volunteer dentists all

necessary data and outlines of talks suitable for student bodies, parent-teacher associations and other groups. These materials are supplied to him by the state society bureau of dental health education. He also directs the activities of the volunteer dentists of his county and serves as chairman of the county dental health committee, which is composed of himself, the county health unit director and county superintendent of education. This committee works to keep the forces of all dental health supervisor. The former is a physician who is a full-time employe of the county, and the latter is a dentist who volunteers his service.) He also receives the inspection cards and other forms from the state board of health and distributes them to the schools of his county. (Figs. 1-4.) After completion of all work and when the dental certificates have been turned in, he returns them to the state central office, where they are compiled as statistics for future reference.

DENTAL HEALTH EDUCATION DEPARTMENT
LOUISIANA STATE BOARD OF HEALTH, BUREAU OF PARISH HEALTH ADMINISTRATION
Under Advisory Supervision of the Bureau of Dental Health Education, Louisiana State Dental Society

Parent or Guardian_____ _____
Name Address

A dental inspection shows that_____is in need of dental attention.
Name of child

For his or her future welfare and proper progress in school, the family dentist should be consulted as to proper treatment, at once. If unable to pay for treatment, please advise the principal of your school and fill in form below.

_____
Dental Inspector.

(To be given to child when inspection is made, to present to parent or guardian.)

APPLICATION FOR FREE DENTAL SERVICE

I hereby apply for free dental service covering above case, as I am unable to pay for treatment.

Occupation of head of family_____Employer's name and address_____

_____Number of children in family_____Number attending school_____Age of eldest_____Youngest_____Number of dependents in family_____Number in family gainfully employed_____.

_____ _____
Signature of Parent or Guardian. (Date)

I vouch for correctness of applicant's statement and approve the claim.

_____ _____
(Date) Chairman Investigating Committee.

(Forward to the dentist to whom this child is assigned for services)

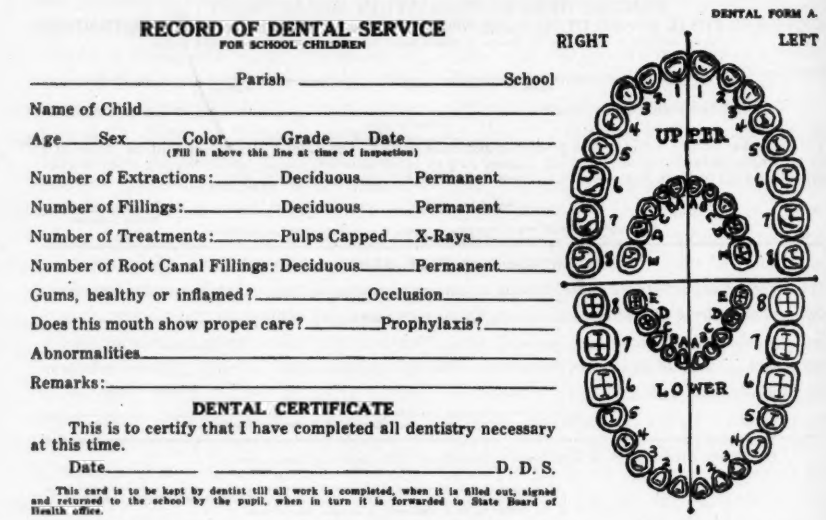
Fig. 1.—Dental form A. The inspection notice, application for free treatment and place for the investigating committee's report are provided on this side of the form.

coordinated, stimulates interest in the program and handles all local problems which arise in connection with the program.

In addition to his work on the committee just mentioned, the health unit director has active charge of this dental health work as a part of the general health program. (The health unit director must not be confused with the county

The county superintendent of education directs the activities of his school principals and teachers in their duties in connection with the program. The school principals are responsible for the proper execution of the program in their school. With the advice of the dental health committee, the principals arrange for the dental inspections in their schools during inspection week so that all inspections are

completed during that period. The week commencing with the first Monday in October is designated as dental inspection week. All school children throughout the state undergo inspection during this time in order that both educational and corrective work may be commenced at once. In order to accomplish this, it is, of course, necessary to have a group of inspectors busy in each school at the same time. These inspections are made under the supervision of the county health unit, and are made by anyone they decide on, dentist for a more careful examination and correction. The school principal, together with the health unit director, local Red Cross representative and a representative from any other local organization that has the approval of the county dental health committee, investigates all claims for free treatment. The principals serve as chairmen of the investigating committees, affix their signature to the applications of those approved, and divide these patients as nearly equally as possible among the volunteer dentists of



DENTAL FORM A.

RECORD OF DENTAL SERVICE
FOR SCHOOL CHILDREN

RIGHT LEFT

_____ Parish _____ School

Name of Child _____

Age ____ Sex ____ Color ____ Grade ____ Date ____
(Fill in above this line at time of inspection)

Number of Extractions: ____ Deciduous ____ Permanent ____

Number of Fillings: ____ Deciduous ____ Permanent ____

Number of Treatments: ____ Pulps Capped ____ X-Rays ____

Number of Root Canal Fillings: Deciduous ____ Permanent ____

Gums, healthy or inflamed? ____ Occlusion ____

Does this mouth show proper care? ____ Prophylaxis? ____

Abnormalities _____

Remarks: _____

DENTAL CERTIFICATE

This is to certify that I have completed all dentistry necessary at this time.

Date _____ _____ D. D. S.

This card is to be kept by dentist till all work is completed, when it is filled out, signed and returned to the school by the pupil, when in turn it is forwarded to State Board of Health office.

Fig. 2.—Reverse side of dental form A, providing the service record chart and dental health certificate.

i. e., members of the health unit, dentists, dental hygienists or teachers qualified to do the work. The teachers are easily trained by a dentist to make these inspections.

This type of inspection seems to work out satisfactorily because, if a single dental defect or an unclean mouth is found, the child is provided with a dental inspection card and instructed to see the family dentist for a more careful examination and correction. The school principal, together with the health unit director, local Red Cross representative and a representative from any other local organization that has the approval of the county dental health committee, investigates all claims for free treatment. The principals serve as chairmen of the investigating committees, affix their signature to the applications of those approved, and divide these patients as nearly equally as possible among the volunteer dentists of the particular community or section. The principals require these children to report to the dentist promptly at the hour assigned, and insist that they keep all subsequent appointments. They also receive the dental certificates from the teachers after they have been returned by the children and recorded on the honor roll. Another of their duties is to fill out the school dental health record chart at the

end of the school term and forward it and the dental certificates to the county health unit director. With the advice of the county dental health committee, the principals arrange for dentists to give at least one monthly talk to the school children, besides building the program for dental health week. In order to encourage the children to obtain dental corrections, the principals frequently offer suitable rewards to the rooms showing 100 per cent corrections.

Education is the work of the teacher. Dental health is recognized as a significant part of education, and we know that the subject can best be imparted to the child by correlation with other subjects of the curriculum. The teacher must, of course, have an appreciation and understanding of the dental needs of her pupils. This need is met by the dental health supervisor and by the distribution of educational material from the bureau of dental health education of our state dental society through the offices of the state board of health. The teachers touch on the question of mouth hygiene each day and make a daily superficial inspection to see if each child is taking proper care of his mouth. In addition, the teacher conducts a dental health program for her room once a month. These monthly programs may consist of a dental lecture to the class, or the pupils may read essays on the care of the teeth, give impromptu talks or make dental posters. The teachers urge all children to have corrections made and use follow-up letters to parents or guardians when they fail to do so. It is suggested to the teachers that they can set a good example by having a dental certificate themselves.

In order to give the campaign a stimulus after it has been in progress for a few months, we have arranged for a dental health week, which is put on sometime in January. This is a concentrated educational campaign which is carried on throughout the state to promote interest in dental health. While we leave the actual details of the program to each locality fostering a dental health week, we suggest that the following form the basis upon which the program is built: talks by dentists to the pupils in all schools and before parent-teacher groups and other interested bodies; essay and dental health talk contests between pupils in each class, and similar contests between representatives of different classes or schools.

VOLUNTEER DENTIST'S PLEDGE CARD

Bureau of Dental Health Education
Louisiana State Dental Society

I hereby pledge myself as a volunteer dentist to help put into execution the campaign outlined by the above Bureau and I further agree to accept any assignments in the education program.

I also agree to give at least one hour a week to the care of the mouths of the worthy poor children either at my office or at a clinic, provided the child shall have proper credentials indicating inability to pay for service.

I further agree that this pledge shall remain in effect for five years from the date the campaign is launched.

Name_____

Street & No._____ Post Office_____

Parish_____ District Dental Society_____

Fig. 3.—The volunteer dentist's pledge card, showing what the members of the state society who sign it agree to do for the promotion of dental health education.

Awarding of prizes to winners of such contests occurs on the last day of dental health week at a special ceremony with all teachers and children of the school present. The public is always invited to attend this part of the program.

The members of our state dental society who have signed the volunteer card, and whom we designate as volunteer dentists, have pledged themselves to carry out certain activities for the advancement of our dental health education program for a period of five years. They have been asked to pledge themselves for this definite number of years; not that we intend to abandon the work at the expiration of this time, but because we have realized that time is necessary to set the machinery in motion and that only by constant repetition over a long period of time can we hope to obtain satisfactory results in the education of the masses. Time and experience are necessary in perfecting a program of such proportions, and we felt that a minimum of five years was essential if we were to expect worthwhile results. The volunteer dentist goes into the schools and makes inspections of the mouths of school children when called on to do so. He also makes dental examinations of children having dental inspection cards. He devotes at least one hour each week to rendering free dental service in a clinic or in his own offices to those indigent children who present the proper credentials. For those children who can afford to pay, he does the necessary dental work and is paid his usual fee by the parents or guardian. After placing the mouth of the child in a hygienic condition, whether it be a private patient or a free patient, the work is recorded on the patient's service record and the dental health certificate is signed by the dentist and returned to the teacher. He also assists in the educational phase of the program by giving talks in schools and before parent-teacher associations and other groups, and accepts other assignments to further the program whenever called on.

SCHOOL DENTAL HEALTH RECORD CHART

_____Parish_____School. Date_____

_____Post Office. _____School Principal.

The following is a summary of dental health activities in above school during the past term:

No. of Children in School_____No. Inspected_____

No. of Children Requiring Treatment_____No. Receiving Dental Certificates_____

No. of Rooms that became 100% corrected_____No. of talks by Volunteer Dentists_____

Are all teachers of your school cooperating in Educational Phase of Program?_____

Remarks:_____

To be filled in by the principal of the school at end of school term and forwarded to Parish Health Unit Director—or if none in Parish, direct to State Board of Health Office. Please add all other information and suggestions under "Remarks".

Fig. 4.—School dental health record chart. This is filled out at the end of the school term by the school principal and forwarded to the county health representative, who, in turn, forwards it to the state board of health office.

With such a program as has just been outlined, carried on throughout the state by the dental profession and linked up with school and public health activities, we shall awaken the public to the dangers of dental neglect and malnutrition and to the necessity for maintaining a healthy oral condition from early childhood. In other words, the masses will become interested in dental health and preventive dentistry will become a reality.

729 Maison Blanche.

DEVELOPMENT OF THE SCIENTIFIC EXHIBIT

By Hugh W. MacMillan and F. M. Deuschle, Cincinnati, Ohio

THE prime function of a scientific convention is educational. Programs and demonstrations are planned to include the most recent advances in the profession. Research workers and expert technicians are in demand to present the latest information to the profession at large, which, in turn, passes it on to the public in up-to-date professional service. The success of a convention should be judged by the excellence of the preparation of the scientific knowledge to be imparted. Every pedagogic method should be used to present the latest findings lucidly, convincingly and practically, since the success or failure of any innovation is determined by the results obtained under working conditions.

The scientific exhibit, as a part of the educational program, affords many unique advantages. By the use of enlarged photographs, diagrams, graphs, charts and motion pictures, a properly prepared exhibit embodies all the points of superiority claimed for visual instruction. Since the display is available for examination during the entire meeting, it is possible for those interested to return again and again to clear up obscure points. Competent persons in charge assure the success of this type of exhibit. If no one is present to explain, the usefulness is seriously impaired. Often, the scientific exhibit drifts into a poster display which is scarcely noticed by the passerby. Such exhibits are largely a waste of time and space and should be eliminated from the convention halls.

In an effort to revive interest in scientific exhibits and to widen their scope, we tried an experiment at the recent Ohio State Dental Society meeting in Cincinnati by presenting a scientific exhibit in the form of a continuous demonstration. The exhibit was titled "Regional Anatomy of the Mouth." As is shown in Figures 1 and 2, the wall displays were augmented by numerous anatomic specimens, dissections, sagittal and coronal sections of the head, embryos, microscopic slides and a reconstruction, by one of us (F.M.D.), of the head of a 3-months human embryo with a double hairlip and cleft palate. Throughout the convention, the following technical procedures were demonstrated on actual specimens: The removal of malposed mandibular third molars in elderly patients, the recovery of mandibular third molars from the sublingual fossa, the recovery of maxillary third molars from the zygomatic fossa,

Fig. 1.—Poster type of scientific exhibit. Such displays are applicable for museum specimens, distribution of literature and propaganda. A motion picture draws attention to the exhibit. A competent person should be at hand at all times to answer questions as otherwise the value of the exhibit is seriously impaired.

wise the value of the exhibit is seriously impaired.

Fig. 2.—Demonstration type of scientific exhibit. The two long tables arranged with working space between are covered with surgical apparatus, mandibles, dissections, cross-sections, microscopes and embryologic specimens. Throughout the entire meeting, demonstrations are made on the counter-like table in front. The screen and table behind are used for display and safe keeping of additional illustrative material.

the recovery of fractured roots from the antrum, the repair of openings in the antrum and the diagnosis and treatment of subperiosteal abscesses of the mandible. The third molar technic was shown step by step on mandibles of the pig, as the erupting teeth in the second or third molar region of the pig present relations almost identical to a vertical "impaction" in the human jaw.

One great advantage of this type of exhibit is that it enables the exhibitor to provide and care for a sufficient number of specimens to illustrate completely all phases of the subject. It also affords an adequate amount of time to cover the subject thoroughly. Proof of these advantages was shown throughout the convention by the large attendance at the exhibit and by the repeated visits of men who would return again and again either to have some obscure point cleared up or to maintain, in no uncertain manner, their opposing views.

Not the least advantage of this type of scientific exhibit is the dignified press publicity which it attracts. The following clipping from the Cincinnati Times-Star is illustrative:

> Interest is being aroused by the elaborate scientific exhibit prepared by Dr. Hugh W. MacMillan and F. M. Deuschle, Cincinnati. Well-preserved anatomical specimens, in which the visiting dentists may follow the course of the nerves, muscles and teeth in the head and jawbone are displayed. The relations of the jaw and the various sinuses of the head are made plain by skillful head dissections. How the upper teeth sometimes penetrate into the antrum and how these teeth, if infected, may carry disease up into the antrum, and how an infected antrum on the other hand, sends its infection down into the teeth of the upper jaw are vital points brought out. It was this exhibit that was recently displayed at the International Dental Congress at Paris. Methods of extracting upper teeth so as not to injure the antrum are also shown, together with many historical data, including an original copy of Hunter's great pioneer work on the jaw and head published over 150 years ago.

A scientific convention is, in the last analysis, a postgraduate course for the general practitioner. A scientific exhibit of the demonstration type combines most of the time-tested features of lectures and clinics with the added advantages of personal contact and individual attention.

CURRENT LITERATURE

EXTRACTS AND ABSTRACTS

Clinical Observations on Some Dental Conditions: The following are described as out of the ordinary cases by A. T. Pitts *(Birmingham (Eng.) M. Rev.):* Paradental Abscesses in the Mental Region. There were seven cases, all in young people, one in a child of 8. The salient feature of these cases was the presence of a sinus in the mental or submental region, periodically discharging, forming a scab at times but never healing. The teeth appeared perfect and no lesions of the gingival margin could be detected. Curettage did not ameliorate the condition. Roentgen-ray examination revealed areas of rarefaction and response to thermal test was abnormal. Extraction, in some cases combined with curettage of the rarefied area, brought about a cure. In one case, a sinus in the center of the chin had persisted for seven months. Two weeks after extraction, the sinus had healed completely. It is suggested that an injury, however slight, as from a blow or the presence of a bristle or fish bone under the gingiva, might be the cause of the infection. The author adds that the paradental abscess suggests the possibility that the teeth may become infected through the blood stream.

Osteomyelitis of the Jaws. The author states that he has seen more than a dozen cases of osteomyelitis of the maxilla in children ranging from a few months old to 2 or 3 years. A sinus may form externally, but more often sinuses appear in the mouth, either in the sulcus, or even in the palate. In spite of the suppuration, often over a long period, the general condition appears to be well maintained and the children seem to suffer little discomfort and recover with surprisingly little deformity. Between the ages of 5 and 10, the mandible is not infrequently the seat of osteomyelitis, but the maxilla is rarely the seat of extensive infection. Some of the cases were definitely tuberculous, while others were a sequel to dental suppuration. The characteristic of necrosis of the mandible in the children is its extreme chronicity, sequestrums coming away over a long period, until a large part of the jaw may be lost. A case is cited in a boy aged 6 years in whom it became necessary to remove the whole of the ascending ramus, including the condyle and a small part of the posterior part of the body of the jaw. A splint was inserted and within three months new bone was being formed, the greater part of the ascending ramus having already re-formed. The keynote to treatment is intensive irrigation of the septic sockets in the hope that the infection will become localized and that the further development of the case will be in the direction of a suppurative condition which can be treated intra-orally. Treatment directed to the outside by incision and fomentation before either are actually necessary may be the worst possible, prolonging the condition and rendering it more severe.

Some Cases of Impaction of Teeth. In one case, a man of 25 noticed a sinus behind the right lower second molar. There was no sign of the third molar. Roentgen-ray examination revealed a large cystic cavity behind the second molar extending into the ascending ramus and the third molar situated immediately beneath the second molar. As the root of the second molar was resorbed, it may be conjectured that the third molar was abnormally placed developmentally and that a dentigerous cyst formed in connection with it, displacing the third molar forward so that it caused absorption of the second molar and thus came to lie immediately beneath this tooth. In a second case, in a youth, aged 20, a lower second molar was found impacted, lying obliquely and directed backward with the distal margin of the crown under the mesial margin of the crown of the third molar. The third molar had two distinct roots and both of them showed distinct bifurcation, especially the anterior root. The roots of the second molar were fused and were deeply grooved on the lingual aspect.

A similar case was seen in the patient's brother. The third case, in a woman, aged 27, was an impaction of a lower first molar against the second molar. The tooth lay between the roots of the molar and bicuspid. The crown of this tooth was missing; the flat plateau formed by the junction of the roots was directed against the lower half of the anterior root of the second molar. The roots of the first molar were lying across the inferior dental canal. It is suggested that the tooth erupted in an abnormal position and that caries occurred with abscess formation and bony absorption around the roots, and the tooth then sank into the abscess cavity; or a dental cyst may have formed and the tooth been displaced into the cyst cavity.

In the last cited case, a maxillary first permanent molar was impacted against the second molar, in a girl, aged 11. An attempt at extraction had failed. A roentgenogram revealed the tooth lying obliquely with its long axis directed forward. The shape of the tooth was abnormal, the roots being very divergent. This probably accounted for the error in developmental position.

Generalized Hypertrophy of Gums in Children. The author cites two cases, one in a girl, aged 5½, and the other in a boy, aged 2. This is a condition of true hypertrophy of the fibrous tissue, noninflammatory and very rare. In the first case, the deciduous teeth were removed, the bony septums between the teeth and the inner and outer alveolar bone were "nibbled" away and the redundant gum both labially and lingually was excised in two long strips. Free hemorrhage was controlled by suturing the raw edges together. Sixteen months later, the gum around the second deciduous molars was practically normal and the first permanent molars had erupted with normal gingival margins. When last seen, the gum round the permanent incisors was definitely thicker than normal, but the condition was much improved. The other case was treated in the same way, at 3½ years, but the result was not satisfactory and it was anticipated that further operation would be necessary. It is suggested that this condition may be associated with lymphatic obstruction; that there may be an inborn tendency to excessive development of fibrous tissue; that it may be due to an aberration of the bone-forming mechanism, or that it may be due to an endocrine disturbance.

Fatal Coronary Occlusion Following Injection of Local Anesthetic: This was the case of a man, aged 49, who had had three teeth removed and, immediately after injection of a standard preparation of procain and epinephrin, had complained of substernal tightness. (Edward Weiss, in *M. J. and Rec.*, Jan. 20, 1932.) He attempted to work the following day, but had to spend the next week in bed. He complained of a feeling of paralysis over the entire upper half of the body, with pain through both shoulders. He again attempted to go to work, but within a few days had to be taken to the hospital, being in a state of collapse. Examination revealed moderate dyspnea and cyanosis, pulse 120, small but regular. The heart sounds were distant and of poor quality but there were no murmurs. The following day, there was a sharp rise in temperature and a chill. The symptoms became more pronounced and myocardial degeneration was diagnosed. Death ensued the fifth day. Necropsy revealed a massive infarction with rupture of the anterior surface of the left ventricle of the heart due to an occlusion by a recent thrombus of the interventricular branch of the left coronary artery just beyond its point of origin. The heart was moderately hypertrophied, the pericardium, thickened, edematous and infiltrated with blood near the apex, and, at the point of rupture of the left ventricle, it was attached and necrotic. The other divisions of the coronary vessels showed marked arteriosclerosis, which was likewise present throughout the aorta and its main branches. There was a recent large infarct in the upper portion of the lower lobe of the right lung with collapse of the remainder of the lobe and a slight excess of blood-tinged fluid in the right pleural cavity. The author comments as follows: "Arteriosclerosis of the coronary vessels had reached an extreme grade in this middle-aged man, who, according to his statement, had been in perfect health until the time of this accident. Moderate heart hypertrophy, retinal arteriosclerosis and slight renal sclerosis indicated probable previous hypertension. The coronary occlusion apparently occurred immediately following an injection of novocain containing adrenalin, although on previous occasions he had had similar injections for the removal of teeth without ill-effects. Whether the adrenalin in the solution acted to produce coronary thrombosis is difficult to say, but the case serves as

an excellent example of the manner in which a chronic pathological process may encroach on the reserve of an organ without producing symptoms until some relatively slight happening precipitates a serious break in function."

History of Agranulocytic Angina: The appearance of the newly described syndrome agranulocytic angina has led O. H. P. Pepper (*J. A. M. A.*, Oct. 10, 1931) to review the literature in an effort to determine under what diagnosis these cases were previously filed. Schultz is given credit for recognizing the syndrome under its present name, in 1922, and Turk is quoted as describing similar cases in 1907, although he did not distinguish them from the commoner leukopenia of overwhelming infection. Reference to standard laryngologic works of fifty years ago affords description of this startling condition, Morell MacKenzie describing it under "putrid sore throat" as "primitive gangrene of the pharyngeal mucous membrane, constituting an affection *per se*, and originating independently of any other malady, such as diphtheria, scarlet fever, etc." He credits Gulber in 1857 and Trousseau in 1865 with having clearly distinguished the condition from diphtheria. It is described in detail and it is stated that but few cases of recovery are on record. As in our own time, the condition was confused with blood poisoning. Peter, in 1870, in writing of gangrenous angina, describes the gross characteristics of the blood carefully, but no conclusions can be drawn from his description. The description of putrid sore throat seems to leave little doubt that instances of what today would be diagnosed as agranulocytic angina were included in the group diagnosed as putrid sore throat. But the diagnosis undoubtedly was applied to a variety of conditions, perhaps including Vincent's infection and diphtheria. It is interesting to note that by the beginning of the new century the textbooks on nose and throat diseases had begun to omit the heading "putrid sore throat," until, by the time Schultz described the syndrome, there was no description in the textbooks which corresponded to the picture of agranulocytic angina. In recent books, this omission is being rectified by the description of the syndrome under its present name.

Diet and Teeth: Prof. Edward Mellanby and his wife are well known for their experimental work on rickets and diet. Last year Mrs. Mellanby, as the result of research performed for the Medical Research Council, published "Diet and Teeth: An Experimental Study: Part I. Dental Structure in Dogs" (*The Journal,* March 8, 1930, p. 728). Her main conclusion was that the development of perfect teeth depended on an adequate supply of vitamin D. Part II has now been published and deals with dental structure in animals other than the dog, such as the rabbit and the rat, and with the experimental production of dental and periodontal disease. Part III is to come and will deal with the structure of human teeth and the part played by diet in the resistance they offer to disease. In part I the influence of specific elements of diet on the structure of dogs' teeth was described. In the present report it is shown that the periodontal structures are subject to similar influences; that immunity from periodontal disease is indirectly, and reaction to attrition directly, dependent on the presence in the diet of certain essential elements. Sound teeth depend on sound diet. If the diet is right the teeth can be trusted to remain sound no matter what conditions prevail in the mouth. Rightness of diet means in the main a sufficient quantity of vitamins A and D. Deficiency of A leads to hypertrophy of the subgingival epithelium and subsequent invasion by pathogenic organisms; deficiency of D, to defects in alveolar bone. A significant fact is the importance of adequate diet in early life, when the teeth and periodontal tissues are developing. If a puppy's diet is deficient in vitamins A and D during the early months, it is liable to develop periodontal disease later, whatever the diet then. On the other hand, a perfect diet in the developing period either prevents or inhibits the production of periodontal disease later even if the diet is then deficient in vitamins A and D. General periodontal disease, including pyorrhea, was found to be controllable by diet; in fact, it could be prevented or allowed to develop by specific dietetic treatment. Diet acts primarily by controlling the developmental structure of the periodontal structures and not by any direct or indirect effects concerned with bacterial decomposition in the mouth. Any external action of food in the mouth is of only secondary importance. Indeed, it was shown that a soft, sticky diet containing abundant carbohydrate could be eaten by dogs, so long as it was of proper nutritional standard, for at least eight years, without the development of periodontal disease. Experimental results with regard to

caries were equally negative as to local causation. Since carbohydrates, and especially fermentable carbohydrates, are generally thought to be the essential factors in modern civilization which have led to the prevalence of caries, a large bulk of sugar or starch was added to the food of some dogs, but no caries was induced. Living cultures of *Streptococcus mutans,* which some consider to be the organism chiefly concerned in the initiation of human dental caries, were added to the daily diet of dogs and were rubbed on the teeth or into artificial cavities after food had been eaten. Similar experiments were performed with *Bacillus acidophilus,* for which the same claim has been made. Caries was never produced, though in the dogs in which artificial cavities had been produced, specific agglutinins appeared in the blood, which seemed to indicate that infection had taken place. Nevertheless, the teeth showed no signs of caries after three years' feeding with the organisms. The response of a tooth to attrition appears to depend also on vitamin D. When the surface enamel is destroyed, the osteoblasts of the pulp become active and secondary dentin tubules are formed. If the diet contains plenty of vitamin D, much well calcified secondary dentin is produced; but, if this vitamin is deficient, poorly calcified secondary dentin or none at all is produced. The response is independent of the primary dentin in the teeth. In part III these results will be related to the human problems, for dental caries is another stimulus to the production of secondary dentin. Calcification of the teeth in rats and rabbits was found to depend on vitamin D just as much as it does on the dog. As these three animals have such different types of teeth, it seems that the calcification of all mammalian teeth is similarly controlled. With abundance of vitamin D in the diet, the teeth are properly formed. With a deficiency, the calcium-phosphorus ratio becomes a significant factor. Irradiation greatly improves calcification when the diet is deficient in calcifying properties.—London Letter, *J.A.M.A.,* July 4, 1931.

Agranulocytosis: Four cases of agranulocytosis are reported by Ragle, Adams and Fay (*New England J. Med.,* Aug. 20, 1931). These cases, which were observed in the course of sixteen months, had only two points in common: At one period in the course of several illnesses they all showed the picture of agranulocytosis in the circulating blood, and after the original observation of agranulocytosis, death occurred at intervals varying from twelve hours to six months. The first, in a woman, aged 45, was obviously agranulocytic angina, a disease entity, the condition developing eighteen days before the patient entered the hospital and terminating twelve hours after her admission thereto. The first symptoms were chill followed by sore throat and rise in temperature. There was no pain, but vague weakness and a "poorly" feeling. Jaundice, loss of weight and loss of appetite developed four days before death. Up to the time she became semicomatose, the patient remained in good spirits. Blood transfusions made no appreciable change in the condition. The second case, in a man, aged 49, increasing weakness had been noted for a year. The patient was an alcoholic addict, and had enlargement of the liver and a septic oral condition. Later, ascites and edema developed, and he was given salyrgan, with improvement over a period of seven weeks. Thereafter, great prostration, aching and a rise in temperature were evidenced. Oral examination at this time revealed very marked ulcerative stomatitis, sponginess of the gums and leukoplakia. The salyrgan was discontinued and the white blood count began to mount steadily, going from 400 to 6,400. About this time, a tooth fell out and there was profuse bleeding from the socket, followed by continuous oozing from the gums. Transfusion was carried out, but the course was continually downward, death ensuing. The author says: "It was felt that this case was of especial interest for the reason that mercury was probably the etiologic agent. We have seen no cases reported as due to mercury, yet mercury is one of the foremost agents in producing stomatitis. Here, there apeared to be a very powerful argument for the contention of Roberts and Kracke that in the disease entity agranulocytic angina the bone marrow lesion is the primary one and the local oral and pharyngeal sepsis a secondary event. In this case, the connection between the clinical condition, the intravenous injections and the blood findings seems far too close to be a coincidence. Also the spontaneous recovery from the agranulocytosis after stopping the salyrgan is strongly confirmatory." In the third case, in a woman, aged 47, the author states that the agranulocytic phase would probably be classified as agranulocytic aleukemic leukemia, with aplastic anemia. The disease recurred after apparent recovery. Early symptoms were

malaise, with profuse sweating and fever, followed by sore mouth and bleeding gums. In the fourth case, a woman, aged 70, died in four days after she was first seen. Necropsy revealed tremendous proliferation of the myelocytic elements in the bone marrow and lymphoid structure while less than four days earlier there was almost total absence of granulocytes in the circulating blood. The author concludes: "On the basis of observed cases it appears only possible to give a pessimistic generalization. Agranulocytosis is an abnormal response, or lack of response, to a toxic stimulus which should call forth great prognostic caution on the part of the clinician regardless of concurrent findings."

Diet and the Teeth: A further notable and outstanding contribution recently published is the second part of the well-known studies conducted by Mrs. Mellanby on the relations between diet and the teeth. The first report published last year and reviewed in these columns gave some most important results, chief among which were the conclusions that the structure of the hard dental tissues in dogs is subject to dietetic influences, and that perfect structure can only be ensured by an adequate amount of vitamin D (or, under certain conditions, by irradiation of the animal). A minimum of calcium and phosphorus has to be included in the diet, but any excess above the minimum is not important; further, it was shown that there is a factor chiefly associated with cereals which hinders calcification. The present report continues to open up the darkness of ignorance in a highly interesting way. It is shown that the structure of the periodontal tissue is subject to definite influences in the diet. A deficiency of vitamin A leads to hyperplasia of the subgingival epithelium and to its subsequent invasion by pathogenic organisms; the deficiency of vitamin D results in deficiency of the alveolar bone. A significant fact is the relative importance of diet in the early period of life when development is taking place. If a puppy's diet has been deficient in vitamins A and D during the early months of life, periodontal disease is liable to develop later, whatever the subsequent diet; but a perfect diet in the early stage prevents or greatly inhibits the production of periodontal disease, even if the subsequent diet is deficient in those vitamins. Although attempts to develop a method of inducing dental caries in dogs have for the most part not been successful, some definite facts are presented. Only two out of twenty-eight experimental dogs have shown carious teeth, and then only in those teeth with cavities in the enamel. The presence in the food of *Streptococcus mutans* and *B. acidophilus* (said to be responsible for human dental caries) does not under experimental conditions induce caries, whether the diet has high or low calcifying properties, or whether there is a large amount of a fermentable sugar like glucose. More promising results have been obtained in rabbits, and although the conditions have not yet been fully worked out, there seems less tendency for invasion when there is abundance of fat-soluble vitamins in the diet. The reaction of teeth to attrition shows renewed activities of the osteoblasts of the pulp and the production of secondary dentine. The intensity of this response depends on the diet during the period of attrition: with abundant vitamin D much well-calcified dentine is produced, indicating increased resistance of the fully erupted tooth, while lack of vitamin D or excess of cereals results in poor calcification. The dietetic factors controlling the structure of rabbits' teeth are in general the same as those in the case of the dog; and similar control by vitamin D occurs in the rat, although in the absence of sufficient vitamin, calcification in rats is more influenced by alteration in the calcium and phosphorus of the diet than is the calcification of dogs' teeth. And in view of the difference in type of the teeth of dogs, rabbits and rats, it is suggested by these results that the tooth structure of mammalia is controlled by the dietetic and environmental factors which Mrs. Mellanby has ably elucidated. The final link, the relation of the work to man, yet remains; and the third report of the series will be awaited with unusual interest, for it is probable that valuable findings will be presented. Meanwhile the workers in preventive medicine will join with the rest of the scientific world in unstinted admiration of Mrs. Mellanby's patient, painstaking and excellent research.—*Public Health,* May, 1931.

Anesthesia in Oral Surgery: That the successful exodontist is the one who operates under ideal anesthetic conditions is the belief of James R. Cameron (*Cur. Res. Anes. Anal.,* March-April, 1931). The two general anesthetics in common use are ether and nitrous oxid-oxygen. Procain has displaced practically all other local anesthetics. The author

performs 95 per cent of all operations under nitrous oxid-oxygen, because it is pleasant to take, permits of leisurely performance of the operation and rapid recovery of the patient, with little or no bad after-effect, and requires a minimum of preparation for its use. The operator who uses it for prolonged operation should be experienced in its use. Its employment throughout the day leaves the operator less fatigued than when local anesthesia is employed routinely in his work. Intra-oral operation under nitrous oxid-oxygen requires close cooperation between operator and anesthetist. Use of a throat pack is advocated. Changes in respiration are a valuable sign in the production and maintenance of anesthesia. When changes are due to too prolonged pressure on the mandible, depression of the tongue or forcing the throat pack past the oral pharynx, this fact should be recognized. The exodontist should be able to evaluate risks, and should, if the operative procedure is to be prolonged or is shock-producing, advise hospitalization, which is especially advisable in cases of advanced cardiovascular disease. For certain major oral surgical procedures, such as resection of the maxilla in malignancy involving the nasal cavity or in cleft palate cases, intra-tracheal ether anesthesia is preferred. In other types of major surgery of the jaws, if the services of an expert anesthetist in the administration of nitrous-oxid oxygen are not available, etherization by the intrapharyngeal method is preferred. Local anesthesia is the method of choice only of the dentist whose practice does not permit having the assistance of a trained anesthetist. It is of greatest value to the slow and timid operator.

Relation of Tonsils and Adenoids to Infections in Children: A study of data based on 4,400 controlled children over a ten-year period, and carried out by Albert D. Kaiser (*Am. J. Dis. Child.,* March, 1931), suggests that certain infections have a close relationship to the presence or absence of tonsils and adenoids. Other infections are not influenced favorably or unfavorably by the presence or absence of this lymphoid tissue. A few infections seem definitely more common in the absence of tonsils. Conditions whose incidence was influenced favorably by removal of tonsils and adenoids were: colds in the head, sore throat, cervical adenitis, otitis media, rheumatic disease, diphtheria, scarlet fever, nephritis and dental infections, the last mentioned occurring only half as often in the children whose tonsils and adenoids had been removed, a condition that may be explained in part by general neglect of the child on the part of the parents. The following infections were influenced favorably to a slight degree or not at all: chorea, measles, laryngitis, tuberculosis and malnutrition; and the incidence of bronchitis, pneumonia and sinusitis was influenced unfavorably.

Asepsis: A Possible Interference with the Physiology of Repair: The repair process in serous cavities and the influence on it of modern methods of surgical technic is given consideration by Herbert L. Johnson (*New England J. Med.,* March 12, 1931), who believes that the physiology of the repair process was designed on nature's intention to entertain infection and contamination in every case of trauma. There is some evidence that bacterial toxins, irritating chemicals and foreign bodies are depended on to stimulate the serosa to a vigorous defense reaction for the purpose of neutralizing the damaging effect of their presence. Structural repair, without the protection of this defense reaction, seems contrary to the scheme of the original repair process. The relinquishment of any small part of the advantages of aseptic surgical trauma is considered inadvisable. It is suggested that the substitution of a suitable artificial excitor of a vigorous defense reaction may neutralize a possible interference with the physiology of repair. The author states that many of his deductions are based on animal experiments and clinical observations; others, purely hypothetical, are submitted in an attempt to present a working hypothesis and to establish a rationale for the employment of a harmless excitor in surgery of the serous cavities.

Malpractice: Unpleasant Taste Not Actionable: An unpleasant sensation as a result of the negligent act of another, without physical or material damage, cannot be the basis of an action for damages. Where, through the negligence of a dentist, a patient is caused to swallow a bitter and ill-tasting liquid, but sustains no ill-effects other than the disagreeable stimulation of the sense of taste, the patient has suffered no actionable damage. The mere fact that one event chronologically follows another is insufficient to prove a causal relation between them. Evidence that a woman suffered a pain in her

heart and other physical ailments after swallowing a liquid—the nature and character of which does not appear, except that it was suitable for hypodermic use by a dentist, while operating in a patient's mouth, and possessed a bitter and disagreeable taste—is, in the absence of evidence tending to show a causal relation, insufficient to authorize an inference of fact that her condition was caused by swallowing the liquid.—Payne v. Chandler (Ga.). 153 S. E. 96.—Medicolegal, *J. A. M. A.*, March 21, 1931.

MISCELLANY

BOOK REVIEWS

Encyclopedia of Dentistry. Edited by Alfred Kantorowicz, Professor of Dentistry, Director of the Dental Institute of the University of Bonn (Germany), Director of the Public School Dental Clinic of the City of Bonn, in collaboration with numerous authorities. Vol. IV, S-Z, with 794 pages and 719 illustrations (Price, 98 RM or $25). Published by Johann Ambrosius Barth, Leipsic, and Hermann Meusser, Berlin, 1931.

This fourth volume, the final part of the encyclopedia (see reviews of Vols. I-III, THE JOURNAL, March, 1930, and April, 1931) includes the subjects coming under the letters S to Z, as well as an index of the entire work. Like the earlier ones, this volume contains a wealth of information on a variety of subjects. To give an idea of the abundance of the material, a few details on several subjects are given here:

Schmelz (Enamel): Development; structure lines of cleavage; comparative histology of the enamel in man and animals; the problem of vital changes in the enamel.

Schulzahnpflege (Dental care of school children): In Germany, the dental school clinics are very popular and take care of a large number of the school children. Regular examinations of all school children are obligatory, and the school clinic takes care of those children whose parents are not financially able to send them to a private dentist. In some small towns, the entire dental school clinic is arranged inside an automobile ambulance and visits in turn the country schools of a district.

Speichel (Saliva): A short but complete chapter on saliva, its chemistry and biology, with the most recent investigations concerning the relationship between saliva and oral and general diseases.

Syphilis: Bacteriology, pathology and diagnosis of the disease with special reference to oral manifestations. This item is a characteristic example of how an extensive subject can be discussed in but seventeen pages and still all information be given that the dentist may want or need without his consulting special textbooks or publications on this disease.

Wurzelkanal (Root canal): This subject is discussed by Hess, who, at the present time, is the greatest authority on the anatomy and morphology of root canals. He illustrates the arrangement and form of the root canals of human teeth by means of vulcanite models obtained by the corrosion method, and by serial sections through roots.

These few subjects may be sufficient to give an idea of the content of the last volume. In looking back over the entire work, which appeared between the years 1929 and 1931, one feels that both the editor and the editing firm should be congratulated on their achievement. With 3,377 pages and 3,626 illustrations, the encyclopedia represents the largest publication of this type that has ever been undertaken. The cooperation of men outstanding in dental science as well as all related fields is a guarantee of the authenticity of the material given, and the arrangement and appearance of the book—the clear illustrations and large clean print—make its study easy and pleasant.

In conclusion, we can only regret that this or a similar book is not available in English. If one should be written, the editor could only improve it by following the example of this German Encyclopedia of Dentistry.

RUDOLF KRONFELD, Chicago.

The Business Conduct of an Ethical Practice. An Exposition of the Application of Business Principles to the Practice of Dentistry Without Transgressing the Rules of Ethics. By S. Joseph Bregstein, D.D.S., Brooklyn, N. Y., Lecturer on Dental Office Administration, Writer on Professional Busi-

ness Management, Former Instructor in Operative Dentistry, New York College of Dentistry, Former Attending Periodontist to Samaritan Hospital, Brooklyn, N. Y. Member of American Dental Association, New York State Dental Society, Second District Dental Society, Kings County Dental Society. Second Edition. Illustrated; 220 pages. Published by Dental Items of Interest Publishing Co., Inc., Brooklyn, N. Y.

The call for a second edition of this book in so short a time is evidence of its popularity. To prove that there is something in this volume aside from salesmanship and the discussion of the dollar, note should be made of the fact that some of the chapters concern themselves with such subjects as "Psychology in Dentistry," and "Personality." An important chapter is that on "The Dental Assistant," a subject which is becoming more and more a matter of prime importance in every office. In the discussion on "The Problem of Fees," we find this most significant quotation from the late Norman W. Kingsley: "The man who works by the hour places himself on a parity with members of a trades union, and the fee system places him on the level with the shop keeper who sells hats, shoes, handkerchiefs, at the same price to all; the poor paying the same as the rich."

The fee question will never be solved till there is a better understanding on the part of both the patient and the practitioner. The former should be made to realize the value of the service he is receiving, and the latter should govern his fees on the basis of equity and justice. Till this is done, there will never be a stable solution of fees.

This book considers so many of the aspects of professional life that its title might well have been extended to include all of the phases of professional contact between patient and dentist. It is a thought-compelling volume and should be widely read.

Practical Dental Metallurgy. A Text and Reference Book for Students and Practitioners of Dentistry, Embodying the Principles of Metallurgy, and Their Application to Dentistry, Including Experiments. By Joseph Dupuy Hodgen, D.D.S., Professor of Operative Dentistry (Formerly Professor of Dental Chemistry and Metallurgy), College of Dentistry, University of California. Revised by Guy S. Millberry, D.D.S., Professor of Chemistry and Metallurgy and Dean of the College of Dentistry, University of California, and John S. Shell, B.S., Assistant Professor of Chemistry and Metallurgy, College of Dentistry, University of California. Seventh Edition. 470 pages; price, $3.75. Published by the C. V. Mosby Company, St. Louis, Mo.

This well known work has been greatly improved since the sixth edition. Some of the previous terms have been omitted, and many of the tables have been rewritten. The book has been made as practical as possible, and particular stress has been placed on the melting of metals. Alloys also come in for much consideration, as naturally does the subject of gold, particularly in the form of foil. The entire book is worthy of a careful reading and study, and it will be found useful to both student and practitioner.

Dental Economics. By Harry J. Bosworth. 616 pages; price, $10.00. Published by the author, 341 E. Ohio Street, Chicago, Ill.

Naturally, the first consideration in a book of this kind is to deal with the subject of selecting a location. Mr. Bosworth has gone into this topic somewhat carefully and has given it much thought. He says: "The population of the various states and the ratio of dentists to the population is not a dependable guide to use in selecting a site for practice." This is so manifestly true that it requires no comment. The time devoted to the study of this matter of ratio is well spent, as also is that of selecting an office site. As between a large city and a small town, the pros and cons are intelligently outlined, apropos of which is the following quotation: "Dentists in small towns are put to greater expense and inconvenience to attend society meetings and clinics, but the progressive man does not permit that to hold him back. The only real handicap to professional advancement in small towns is the lack of opportunity for close daily association with other dentists."

Another quotation relative to the subject of partnerships is worthy of consideration: "Partnerships are seldom successful and there is little if any advantage in such an arrangement, for it is difficult to apportion the work evenly and instead of two men attracting more patients, one usually drives the other's patients away. Partnership and group or unit practice seldom prove satisfactory. These men would make more money and be much happier if each had his own office and practice."

A very noticeable thing about this book is that the author continually refers to the de-

sirability of a dentist getting happiness out of his work.

The chapter on "Selling" makes less of an appeal to the reviewer than the quotations just mentioned. Psychology in any pursuit where contact with the public is involved is an essential to the harmonious conduct of one's affairs, but to manifestly play psychology in an attempt to impress the people is of doubtful value and usually in the end reacts disadvantageously. We would suggest that in a second edition this chapter be condensed and revised, which we think would greatly strengthen the book.

Speaking of the question of fees, the author says: "Fees are important but it is not necessary to depend on large fees or big cases to make a dental practice profitable. The man whose fees are so large that only a limited class of people can afford to pay for his services, usually places himself in a dangerous position unless he has a bounteous following of wealthy people, for when business reverses occur even his wealthy patients are forced to economize, his quota of extensive restorations will be lessened, and only too often his revenue is nearly wiped out."

To go over this book in detail is impracticable owing to limitations of space, but emphasis might be made on such chapters as "The Dental Assistant," which contains many excellent suggestions; and particularly the various record charts, and bookkeeping forms, all of which have been worked out in much detail.

Through the entire book there runs the admonition as to the necessity for neatness, cleanliness and orderliness in the conduct of a practice, which really constitutes itself one of the requisites in dental economics.

The book is beautifully bound and typed, and is a fine example of the printers' art.

Books Received

Orthodontic Directory of the World. Seventh Edition, 1932. William C. Fisher, Editor, 501 Fifth Avenue, New York City.

Principles of Dental Histo-Pathology, Clinical Pathology and Therapeutics. By Frederic James, L.M.M.S.S.A. (Lond.), D.D.S. (Penn.), Professor Dental Histo-Pathology, Clinical Pathology and Therapeutics, Temple University Dental School, Philadelphia; Director Henry Isaiah Dorr Research Laboratory; Member British Medical Association, London; American Dental Association; Pennsylvania State Dental Society; Academy of Stomatology and North Philadelphia Association of Dental Surgeons; Pathological Society, Philadelphia; Member Research Society; Sigma Xi, University of Pennsylvania; Late Demonstrator in Comparative Odontology and Histo-Pathology, University of Pennsylvania. Edwards Brothers, Inc., Ann Arbor, Mich.

Preparing Teeth for School. A booklet put out by the Cleveland Child Health Association, 621 Federal Reserve Bank Bldg., Cleveland, Ohio; 1931; 16 pages; illustrated; price, 5 cents.

Preschool Clinic. University Public Health Nursing District, Cleveland, Ohio. Published by the Cleveland Child Health Association, Cleveland, Ohio. 10 pages; 6 illustrations.

SOCIAL INSURANCE: GOVERNMENTS INEFFICIENT, CORRUPT OR BOTH

By Edward H. Ochsner, M.D., Chicago, Ill.

One of the first questions that naturally arise regarding social insurance is: Have any of our governmental agencies so conducted themselves in the past as to make it reasonably safe for us to entrust so stupendous a function as universal social insurance to any branch or department? I maintain that most local as well as state governments are inefficient or corrupt, and some are both.

Let any one who doubts the correctness of this statement spend a little time in looking around with a critical eye to observe how most local governments, the various departments of the state in which he lives and the departments of the federal government are conducted, and I am convinced that he will find more inefficiency than he has ever dreamed could exist. If he does not personally know of corruption and inefficiency in government, let him but scan one single daily newspaper regularly for a month in order to be convinced. And what else can one expect who is at all familiar with politics as it has been played and managed in the United States in the year 1931—the manner in which most men secure their nominations and later their elections, and to whom they are beholden when they take office?

We have all seen the statement repeatedly in the public press, but have never seen it successfully refuted, that, in many of the political subdivisions of our country, only 60 per cent of the taxes collected are effectively spent, the remainder being frittered away,

wasted or stolen. This inefficiency and corruption is due to many conditions, of which some of the more important are: The fact that, so far, no formula has been discovered according to which the most efficient, honest, industrious and worthy members of the community can be secured for public office; nor has there been any method devised whereby spoils politics, favoritism, pull, nepotism, waste and graft can be eliminated with even a reasonable degree of certainty.

The individual who could solve these two problems would be not only the greatest benefactor of the human race but also the wisest man the world has so far produced. Plato tried to solve this problem twenty-three centuries ago when he wrote his "Republic." For a time, he actually thought he had found a solution. He prevailed on the King of Syracuse to adopt his plan and put it into operation. The King tried it for a while, tired of it and sold Plato into slavery. Some good friends ransomed him. After that, he was not so sure that his scheme would work in practice.

Things are not much different today from what they were in the time of Plato—only worse; worse because of the increase in population resulting in larger governmental units, the enormous increase in the number of those exercising the franchise, the increase in the percentage number of ignorant voters and the ever increasing astuteness and finesse of our practical politicians.

Inefficiency and corruption is so common that we have become callous to it. We are annoyed by it, we grumble and complain mildly about it, we pay our ever-mounting taxes if we have anything with which to pay and "let it go at that." It almost seems that we humans had adopted David Harum's dog philosophy and were applying it to ourselves. He said: "A certain amount of fleas is good for a dog, it keeps him from brooding on being a dog."

The best illustration of governmental muddling in general is to be found in the mess most governments of the world have made of themselves during the past twenty years. As examples, we need but call attention to the virtual bankruptcy of Germany and of Austria, the maladministration in Russia, the revolutions in Spain, China, Central and South America, the dictatorships in Poland and Italy, and when we come nearer home, the general lawlessness in the United States, with its murders and kidnapping for ransom; conditions in the city of New York as disclosed by the Seabury Investigation; the virtual bankruptcy of Chicago and Philadelphia, and the near bankruptcy of many other governmental units.

Let us study conditions in our own country a little more in detail in order to determine whether it would be wise or even safe to entrust the federal, state and local government, or any one of them, with supervision over the private lives of its citizens. (This phase of the problem will be taken up more in detail in future installments.)

MAY DAY—NATIONAL CHILD HEALTH DAY

Support your community child health program: it protects your home. This is the slogan chosen for May Day—National Child Health Day, 1932, by the May Day Committee of the state and provincial health authorities of North America. It calls to us in the name of those things which are dearest to every normal human being and every worthy citizen. It speaks of our children, our homes, our community; it reminds us of their well-being and their protection. It challenges our sense of responsibility for them. They are the fundamentals that determine our happiness as individuals and as a nation.

We have learned a finer sense of values in the last several years. We have found "keeping up" with our neighbors far less important than *sharing* with them. We have rediscovered the fact that selfishness does not always pay and that unselfishness brings dividends of happiness and security. We have let go of many superfluities and, in our apprehension lest we should have to lose more than these, we have found that our wives, our husbands, our children, our homes, our neighbors are dearer to us than our pretensions. We have set our eyes steadily on the fundamentals of life and we will work and fight to preserve them with all our American courage that recognizes only success and with all our human hearts that cannot be defeated.

Among the fundamentals upon which May Day—National Child Health Day, 1932, focuses our attention are three elementary necessities: the nutrition of our children, the importance of an adequate, clean and safe supply of milk, and the protection of motherhood.

We will fill our May baskets with flowers. But we cannot stop there. We must develop a

definite community procedure to ensure that every day in 1932 brings to every child at least the three bare essentials of milk, bread and some fruit or vegetable. We must be sure that every mother knows how to concentrate first on these essentials in the diet of her children and after that to supplement her menus in accordance with her means. The records of medicine and the sciences, including x-ray pictures, show beyond a doubt that if children lack essential body-building elements this year, these cannot be made up to them next year. This lack leaves a permanent mark even in the bones. Growth and development are stunted unless the essentials are provided.

If the essentials in the diet of children are to show results in smiling faces and alert minds and bodies, these essential foods must be safeguarded from contamination. This is especially true of milk. "Milk builds bone and muscle better than any other food." Yet unless it is made safe by adequate pasteurization, it may spread disease. Milk-borne epidemics of typhoid fever, scarlet fever, septic sore throat and diphtheria have not decreased during the past dozen years. They usually occur in small towns and rural districts which do not require adequate pasteurization of their milk supply. In these communities, then, for the protection of their children's health, families are working together to secure safe milk, meanwhile practicing at home the simple measures necessary for safeguarding the milk which they consume.

That the growing body of the child may utilize to the best advantage the food it gets, sunshine and relaxation are necessary. A measure of the joyfulness associated with May Day should be part of every day's health program. In 1932, therefore, even more than in recent years, every citizen interested in the health of children is supporting community measures for recreation. Since, in the words of Dr. Miriam Van Waters, of the Los Angeles Juvenile Court, young people need "flowers, trees, water, earth and rocks," we should extend rather than curtail the development of parks and playgrounds, nature study, artcraft and hobby clubs. Public-spirited men and women, in order to lessen the effects on children of nervous tension in those around them, are encouraging groups like these and are securing wise leaders for them.

Finally, what of the prospective mothers, the women who are carrying new life? In them, we have a prime duty to our neighbors. The child's life and health are at stake. The mother's life and health are at stake, and, in many, many cases, the well-being of the other children at home and the preservation of the home itself are at stake. Social workers tell us over and over again that more families are broken up by the death or invalidism of a mother than by any other thing. May Day—National Child Health Day surely means that every child has a right to be well born of a healthy mother who will live to love her child and to take care of her family. This aim in a year when many mothers are enduring privations challenges us with one of the most vital problems of our times. What are we doing to provide prenatal, natal and postnatal care for every prospective mother? We can solve this problem. To attack and conquer difficulties is bred in our American blood and bone. Therefore, May Day—National Child Health Day, 1932, summons us to the conquest of fundamental happiness and security by the preservation of life and health—the life and health of American motherhood.

GORGAS ESSAY CONTEST ANNOUNCED

The fourth annual health essay contest for high school juniors and seniors, sponsored by the Gorgas Memorial Institute, Washington, D. C., will open in high schools, February 7 and close March 15. The subject of the contest is "Mosquitoes; Their Danger as a Menace to Health, and the Importance of Their Control." The donor of the prizes is Mr. Henry L. Doherty, president of the Henry L. Doherty Company, New York City, who has long been interested in this health problem. High school winners will receive a handsome Gorgas medal, and will qualify for entrance in the state contest. State winners will be awarded $10 in cash, and will qualify for entrance in the national contest. The winner of first national prize will receive $500 in cash, and a travel allowance of $200 to Washington to receive the award. The second national prize will be $150 in cash, and the third national prize $50 in cash. The winner in each high school will be selected by a faculty committee appointed by the principal. The winning essay, with official entrance blank and photograph of the winner will be forwarded by the principal to the Gorgas Memorial for entry in the state contest. A committee of three state officials

will judge the winning high school papers and select the winner in each state. The winning state essays will then be entered in the national contest, the judges of which will be the U. S. Commissioner of Education, the Surgeon General of the U. S. Public Health Service, and the director general of the American College of Surgeons. Twelve thousand students in forty-three states participated in last year's Gorgas essay contest. The winner was Miss Helen Dale, San Diego, Calif. Second prize was awarded to William F. Bullock, of Brandon, Miss., and the third award went to Miss Margaret E. Beal, of Hammonton, N. J.

For detailed announcement, write the Gorgas Memorial Institute, 1331 G Street, N. W., Washington, D. C.

NEWS

Japan Orthodontic Society First National Congress: Announcement is made of the First National Congress of the Japan Orthodontic Society, which will be held in Tokyo early in April. This society, which was organized five years ago, was augmented last year by the amalgamation with it of the various orthodontic organizations throughout the provinces of Japan. Umahiko Enomoto is president of the Japan Orthodontic Society; Mitsuru Okada, vice president, and Hiroshi Iwagaki, general secretary.

Decision in Painless Parker Case: By a supreme court decision, three dentists who worked, with two other dentists, under the Painless Parker group, and later formed a partnership similar to the one known as the Painless Parker, have had their licenses permanently revoked. These men, Charles W. Patch, J. H. Miller and Joseph R. Walsh, with B. G. Savelle and A. W. Heitler, were refused a license to practice dentistry as a corporation under the name Painless Parker in a decision of the supreme court some time ago. Drs. Savelle and Heitler ceased operations as soon as the ruling was handed down, but Patch, Miller and Walsh formed a similar company on the "Painless Parker" plan of operation. The state dental board revoked their licenses, but a district court restored them on appeal. In the recent court decision, it was suggested that the licenses of Savelle and Heitler be restored possibly after one year as they were less guilty than the others involved.

Deaths

Burcham, William Joseph, Georgetown, Texas; Washington University School of Dentistry, 1904; died January 13; aged 55.

Murphy, John R., Chicago, Ill.; University of Illinois, College of Dentistry, 1902; died recently, after a prolonged illness.

ANNOUNCEMENTS*

CALENDAR OF MEETINGS

American Dental Association, Buffalo, N. Y., September 12-16.

American Board of Orthodontia, Toronto, Canada, May 16-17.

American Dental Society of Europe, Baden-Baden, Germany, August 9-11.

American Society of Orthodontists, Toronto, Canada, May 18-20.

Central Pennsylvania Dental Society, Altoona, February 29-March 1.

Four State Postgraduate Clinic, Washington, D. C., March 29-31.

Great Lakes Association of Orthodontists, Detroit, Mich., February 29-March 1.

Italian Stomatologic Congress, Rome, September.

New York Society of Orthodontists, New York City, March 9-10.

Northern Ohio Dental Association, Cleveland, June 6-9.

Society for Advancement of General Anesthesia in Dentistry, New York City, third Monday in February, April, October and December.

Southern Society of Orthodontists, Knoxville, Tenn., October 31-November 2.

Thomas P. Hinman Midwinter Clinic, Atlanta, Ga., March 14-15.

STATE SOCIETIES

District of Columbia, at George Washington University, Washington, D. C., second and fourth Tuesdays in each month from October to June, inclusive.

March

Connecticut, at New Haven (March 30-April 1).

April

Alabama, at Birmingham (12-14).
California, at Oakland (4-6).
Kansas, at Wichita (25-27).
Kentucky, at Louisville (4-6).
Louisiana, at Monroe (14-16).
Michigan, at Detroit (11-13).
New Jersey, at Atlantic City (13-15).
Oklahoma, at Muskogee (19-23).

May

Illinois, at Springfield (10-12).
Indiana, at Indianapolis (16-18).
Iowa, at Des Moines (3-5).
Maryland, at Baltimore (2-3).
Massachusetts, at Boston (2-5).
Missouri, at Joplin (16-18).
Nebraska, at Lincoln (16-19).
New York, at Albany (11-13).
North Carolina, at Elizabeth City (2-4).
South Carolina, at Greenville (23-24).
South Dakota, at Sioux Falls (16-18).
Texas, at Dallas (17-20).
Tennessee, at Memphis (9-11).
Vermont, at Burlington (18-20).
Virginia and West Virginia, at Winchester, Va. (16-18).

June

Arkansas, at Little Rock (6-8).
California (Southern), at Los Angeles (13-15).
Colorado, at Estes Park (20-22).
Georgia, at Atlanta (8-10).
Maine, at South Poland (16-18).
Montana, at Bozeman (June 30-July 2).
Nevada, at Reno (4).
New Hampshire, at North Conway (1-3).
Wisconsin, at Milwaukee (7-9).
Wyoming, at Thermopolis (27-28).

July

Washington, at Seattle (5-9).

STATE BOARD OF DENTAL EXAMINERS

Indiana, at Indianapolis, June 15. J. M. Hale, Secretary, Mt. Vernon.

Iowa, at Iowa City, May 30-June 2. Hardy F. Pool, Secretary, Mason City.

Kansas, at Wichita, April 25-27. Fred A. Richmond, Federal Reserve Bldg., Kansas City.

Kentucky, at Louisville, June 8-11. Robert L. Sprau, Secretary, 970 Baxter Ave., Louisville.

*Announcements must be received by the fifth day of the month in order to be published in the forthcoming issue of the THE JOURNAL.

Maine, at Augusta, June 20-22. Alton H. Swett, Secretary, 192 State St., Poland.

Minnesota, at Minneapolis. W. H. Smith, Secretary, 2337 Central Ave., Minneapolis.

New Jersey, at Trenton, June 27-July 2. John C. Forsyth, Secretary, 148 W. State St., Trenton.

Ohio, at Columbus, June 27. M. H. Jones, Secretary, 1553½ N. 4th St., Columbus.

Pennsylvania, at Pittsburgh and Philadelphia, June 16-20. W. A. McCready, Secretary, 1115 Highland Bldg., Pittsburgh.

MINNESOTA BOARD OF DENTAL EXAMINERS

The next meeting of the Minnesota State Board of Dental Examiners will be held at the University of Minnesota, Minneapolis, June 10-16. For application and further information, address

W. H. SMITH, *Secretary*
2337 Central Ave.
Minneapolis

NORTHERN OHIO DENTAL ASSOCIATION

The Diamond Jubilee Meeting of the Northern Ohio Dental Association will be held in Cleveland at the Hotel Cleveland, June 6-9.

J. C. MCCONKEY, *Chairman of Publicity*
701 Renkert Bldg.
Canton

OHIO STATE DENTAL BOARD

The next examination of the Ohio State Dental Board will be held at the College of Dentistry, Ohio State University, Columbus, the week beginning June 27. Applications must be in the hands of the secretary at least ten days before date of examination. For further information, apply to

M. H. JONES, *Secretary*
1553½ North Fourth St.
Columbus

MISSOURI STATE DENTAL ASSOCIATION

The next meeting of the Missouri State Dental Association will be held at Joplin, May 16-18.

JAMES R. O'NEAL, *Chairman*
Publicity Committee
University Club Bldg.
St. Louis

SOUTHERN SOCIETY OF ORTHODONTISTS

The annual meeting of the Southern Society of Orthodontists will be held in Knoxville, October 31-November 2.

G. M. ANDERSON, *Sec'y-Treas.*
831 Park Ave.
Baltimore, Md.

TENNESSEE STATE DENTAL ASSOCIATION

The Tennessee State Association's Program of Progress meeting will be held in Memphis, at the Hotel Peabody, May 9-11.

E. J. JUSTIS, *Secretary*
Exchange Bldg.
Memphis

MAINE BOARD OF DENTAL EXAMINERS

The regular meeting of the Maine Board of Dental Examiners will be held at the State House, Augusta, June 20-22. Applications should be in the hands of the secretary ten days before date of board meeting. For further information and application blanks, apply to

ALTON H. SWETT, *Secretary*
192 State St.
Portland

INTERNSHIP

Applications for the dental internship at Georgetown University Hospital, Washington, D. C., should be sent to the chief of the Dental and Oral Surgery Department, Georgetown University Hospital on or before June 1. The vacancy will occur July 1 and the internship is for one year.

JOINT CONVENTION OF THE BRITISH AND CANADIAN DENTAL ASSOCIATIONS

The British, Canadian and Ontario Dental associations will meet in joint convention at the Royal York Hotel, Toronto, August 8-12. Essayists and clinicians from the British Isles, the United States and Canada will have a part in the program. Members of the American Dental Association are invited to attend.

FRED J. CONBOY, *Secretary*
Publicity Committee
East Block, Parliament Bldgs.
Toronto

EASTERN SOCIETY OF DENTAL ANESTHETISTS

The third lecture of the season of the Eastern Society of Dental Anesthetists will be held at the Hotel Westover, 253 W. 52d St., New York City, March 18, at 7:30 p. m.; M. Hillel Feldman, speaker.

JOHN B. WOODMAN, *Secretary*
57 W. 67th St.
New York City

DENTAL SOCIETY OF THE STATE OF NEW YORK

The Dental Society of the State of New York will hold its sixty-fourth annual meeting in Albany, May 11-13. Literary exercises, exhibits, etc., will be held at the Hotel Ten Eyck. E. W. Briggs, 1116 Madison Ave., Albany, is chairman of the exhibits committee; D. E. Hurley, 80 Fourth St., Troy, chairman of the clinics committee. The Executive Council will convene for the transaction of the business of the society, May 10, 3 p. m.

Application has been made for reduced R. R. fare on the certificate plan in the following states: New England States, New Jersey, Pennsylvania, New York, Ohio and Michigan, and in Canada. Procure a certificate when going and deposit it at the registration booth for validation. If 100 certificates are validated, a one-half fare will be granted on the return trip.

For information with reference to the literary exercises, clinics, etc., apply to

A. P. BURKHART, *Secretary*
57 E. Genesee St.
Auburn

DENTAL HYGIENISTS ASSOCIATION OF THE STATE OF NEW YORK

The Dental Hygienists Association of the State of New York will hold its twelfth annual meeting, May 11-13, at the Centennial Hall, Albany.

BLANCHE A. DOYLE, *President*
EUGENIA SOMMA, *Publicity Chairman*
1716 Undercliff Ave., Bronx
New York City

ST. LOUIS STUDY CLUB OF DENTISTRY

The fourteenth annual banquet of the St. Louis Study Club of Dentistry will be held March 9 at 6:30 p. m. in the ballroom of the Forest Park Hotel, 4910 West Pine Blvd., St. Louis.

PSI OMEGA FRATERNITY

Psi Omegans are invited to attend memorial exercises which are to be held at Gamma Tau Chapter House, 875 Piedmont Avenue, N. E., in Atlanta, Ga., April 18, at 2:30 p. m. The Atlanta Alumni Chapter of Psi Omega is unveiling a bronze tablet dedicating the beautiful home of Gamma Tau Active Chapter of the Atlanta Southern Dental College as a memorial to our late brother and supreme grand master, DeLos L. Hill. An appropriate program for the occasion has been arranged, and there will be present several members of the supreme council; also representatives from a number of active chapters.

CONNECTICUT DENTAL HYGIENISTS' ASSOCIATION

The eighteenth annual convention of the Connecticut Dental Hygienists' Association will be held at the Troup Junior High School, New Haven, March 31-April 1.

B. H. RAY
Publicity Committee
18 Norris St., Spring Glen
New Haven

NEW JERSEY STATE DENTAL SOCIETY

The program of the sixty-second annual session of the New Jersey State Dental Society is to be presented by teachers from New York University, the subjects being dental psychology, diet and nutrition. Clinics will embrace every phase of dentistry. E. L. D. Hester, 34 East Palisade Ave., Englewood, is chairman of the exhibit committee.

F. K. HEAZELTON, *Secretary*
223 East Hanover St.
Trenton

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1931-1932

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George B. Winter, '34.....Frisco Bldg., St. Louis, Mo.
Albert W. Crosby, '34.....215 Whitney Ave., New Haven, Conn.
Edward H. Bruening, '33.....620 City National Bank Bldg., Omaha, Nebr.
Harvey J. Burkhart, '33.....Box 35, East Avenue P. O., Rochester, N. Y.
W. O. Talbot, '33.....Medical Arts Bldg., Fort Worth, Texas
Arthur Cornelius Wherry, '33.....910 Deseret Bank Bldg., Salt Lake City, Utah
James A. Brady, '32.....2108 N. Broad St., Philadelphia, Pa.
Sheppard W. Foster, '32.....849 Peachtree St., Atlanta, Ga.
Frederick H. Lum, Jr., '32.....151 Main St., Chatham, N. J.
C. N. Johnson, '32.....212 E. Superior St., Chicago, Ill.
J. J. Wright, '32.....1218 Wells Bldg., Milwaukee, Wis.